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RATE-OF-RETURN ON SECONDARY EDUCATION IN THE BAHAMAS

by

ASEFA GABREGIORGIS

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled RATE-OF-RETURN ON SECONDARY EDUCATION IN THE BAHAMAS submitted by ASEFA GABREGIORGIS in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY.

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ABSTRACT

The purpose of this study was to investigate the social and private financial returns to different amounts of secondary education, grades 7-13 inclusive, of the Bahamas male labor force. The basis of the investment analysis is human capital theory.

The private direct investment on secondary education consisted of tuition fees, expenditure on books, equipment and supplies minus subsidies, whereas the social direct investment consisted of salaries and wages of school personnel, expenditures on books, equipment and supplies, subsidies to students, administrative and capital costs. In addition, foregone earnings were assumed as investment both for individuals and the society at large at grade 10 and over. In other words, the investment of the lower secondary level, which is composed of grades 7, 8, and 9, were limited to direct costs alone, because this level is normally covered before the age 15, which is the lowest age limit for this study. The private and social direct costs per student per secondary grade was found to be $97.00 and $666.00, respectively, in 1970-71 academic year. These costs and the foregone earnings, which were taken directly from earning profiles, were compared with age-education mean annual earnings profiles that were derived from the _1970 Bahamas Census of Population_. The earnings are before tax because there is no direct personal income tax in the Bahamas.

Present values and internal rates-of-return analysis were employed to evaluate the profitability of secondary education. To capture the influences of factors assumed to be responsible for age-education earnings differentials, the data were analyzed using the earnings of the employed male, and adjusted age-education mean annual earnings by unemployment rates, by five-year age-groups and level of education, a secular growth rate of 2 percent, and an alpha coefficient of 60 percent separately and in various combinations. All together eight adjustments were employed and the marginal and average present values and internal rates-of-return were computed for each adjustment. In addition, six discount rates of 0, 5, 6, 8, 10 and 12 percent were used to analyze the present values under each adjustment.

The eight adjustments and six discount rates generated 2688 marginal and average social and private present values of net benefits. Moreover, 448 marginal and average social and private internal rates-of-return were generated in this study.

The analysis revealed that one or more secondary grades are financially beneficial to individual investors and to the society even under the assumption that only 60 percent of lifetime earnings differentials are attributable to educational investment. But the magnitude of returns depended very much on the adjustment employed.

The findings in this study show that the magnitude of profitability of education depends very much on the assumptions made in the analysis of the benefit of secondary education. In the case of the Bahamas secondary education, even the lowest possible returns are fairly high both in terms of present values and internal rates-of-return for possible further investment to expand secondary education. Comparisons with studies in other countries showed that the social and private rates in this study are slightly higher than the equivalent returns in other countries, in most cases. The results also indicated that the concomitant use of present values and internal rates-of-return models in evaluating the economic value of education may provide better information than any one of them can provide for decision making. Between the two, the issues of efficiency of resource allocation and the subsequent cash flows that accrue from a given educational investment can be resolved.

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CHAPTER I

INTRODUCTION

Education, in most countries, takes a substantial share of society's scarce resources. Tax payers are questioning the qualitative and quantitative aspects of educational activities in view of the resource inputs to education vis-a-vis other investment opportunities. The questioning is particularly important in less developed countries. Consequently, these countries are searching for new and better ways of using their resources to speed up their economic and social development. The questioning of resource allocation is not limited to the social costs. Individuals ask themselves: "Should I invest my time and limited resources to furthering my education, or should I do something else instead?"

The economics of education, particularly the study of the rate-of-return on education, is intended to provide economic information to help societies and individuals to make decisions in their investment among competing alternatives. While this resource allocation among alternatives is important both in developed and devloping countries, the issue becomes even more important in developing countries. Thus, this study is directed to one of the developing countries, namely the Bahamas, to find the economic value of secondary education from the standpoint of society and individuals.

A number of studies in the economics of education in developed countries indicate that education is a profitable investment. The few available studies in less developed countries also indicate that education may be an important investment. But, further studies in less developed countries are warranted to increase the knowledge of the concept of human capital and perhaps to test the applicability of the techniques to evaluate educational investment.

THE SETTING

The Bahamas had been a British Colony up to July 13, 1975.[1] Its economy is, by and large, dependent on one commodity--tourism--because of its conducive weather and political climate. Tourism accounted for 70 percent of the GNP as of 1972 according to the Caribbean Yearbook (1974:55). While the dependency on a few commodities reflects the situations of most developing countries, the Bahamas is different from most less developed countries, at least in one respect. Its per capita income of $1,682 as of 1970 is fairly high (Labour Force and Income Distribution, 1973a:xxxii).[2] This per capita income of U.S. $1682 suggests that the Bahamas cannot be considered as being one of the less developed countries. However, in the words of the Prime Minister of the Bahamas, Mr. Pindling, and others in his Government, the situation is not as simple as the per capita income indicates. Speaking to the Teachers' Annual Conference on the role of education in development, Mr. Pindling (1975:2) said:

---

[1] The West Indies & Caribbean Yearbook, England: Chapel River Press, 1974:29.

[2] David Powell (1973:65) reported the GNP per capita of the Bahamas in 1970 to be US$2300, about 37% more than what the Gov't. of the Bahamas report shows. In the same report, Powell quoted, for example, the GNP per capita income of Canada & U.K. as being US$3700 & U.S. $2270, respectively. One Bahama dollar (B$) is equal to one American dollar (US$) since 1960's. For the exchange rate, refer to U.N. Statistical Yearbook, 1976, 28 Issue:p.695.

> ... it is wiser for developing countries such as ours, in our effort to analyze and amplify the meaning of "development", to take time out to understand what development has meant to other countries for just as there has developed confusion between the meaning of "education" and the meaning of "development", ...

In clarifying the meaning of economic growth and development and the role of education, Mr. Pindling (1975:3) stated:

> The fundamental problem that economic growth seeks to solve is 'how to create wealth' whereas the real purpose of economic development is how to produce in people the capacity to create wealth. The first requires only an investment in things, the second requires also an investment in people. And that is where education comes in.

Other authorities in the field of development who have tried to categorize countries by their level of economic development defined underdeveloped countries as those having U.S. $500 or less per capita income. Others, such as Martin Carnoy (1972:191), put the dividing line in 1970 to be U.S. $750 per capita income. On the other hand, Iserdeo Jainarain (1976:5) put the dividing line as being US $1100 in 1969, or one-fourth of the United States per capita income. Jainarain justified the 1/4 figure as being a better measure for the fact that in 1969 the average per capita income of the world was US $860. Having analyzed many definitions given by different writers and United Nations documents, Jainarain (1976:11) stated:

> Hence an underdeveloped country would be defined as one having a low level of per capita income - about one-quarter of that of the United States; a low level of domestic savings, and an unchanging structure of production.

Underdevelopment can also be defined in terms of life expectancy, calorie intake, housing conditions, educational attainment, and the like. However, as Jainarain (1976:6) said these indices, while they provide better indications of the "quality of life" of people more than per capita income, are largely dependent, not independent variables. Some other attempts have also been made to differentiate developed from developing countries. One major characteristic is to describe countries in terms of 'center' and 'periphery'. The periphery countries have one or two major export industries, which are simply extensions into the economy of center countries. To this effect, Jainarain (1976:7) observed:

> The centre countries are highly industrialized while the periphery countries are characterized by foreign-owned primary production mainly for export, to the centre, and such growth as they achieve is merely a reflection of the expansion of demand from the centre.

The Bahamian case probably fits to the characteristic described under the centre and periphery categorization more than the per capita income. The Bahamian economy depends very largely on the tourist industry and other related economic ventures (Chodos, Robert, 1977:20,48,91,92,95, 96 and Powell, 1973:208-209). Any drop, particularly in tourism, is bound to have a very substantial effect on the economy of the Bahamas. The country has very little control over some sectors of its economy. The experience of the 1970s illustrates this point very clearly. As Powell (1973:208) reported:

> In 1970, tourist figures for the Bahamas Islands dropped for the first time; from 1,332,396 in 1969 to 1,298,344. Adverse publicity following outbreaks of civil unrest throughout the Caribbean was partly responsible, together with continuing economic recession in North America.

Similarly, the report in the Barclay Caribbean Bulletin (1970:10-11) gives the reason for the fall of tourism as being the United States recession, the increase in cheaper alternative attractions, and cold spells in the month of January. These external variables leave the Bahamas in a vulnerable position so that it has very little room to maneuver and to make alternative choices in its economic development.

The Caribbean countries, of which the Bahamas is a part, have another important characteristic that make them dependent on other countries. Powell (1973:9) observed that the small size of individual territories and markets and lack of available land and natural resources, of local capital and skill, hinders the economic independence. Powell (1973:9) added, "These deficiencies make either for a high degree of inevitable dependence on outside markets, capital and aid, or else for economic stagnation...." Referring particularly to education in the Caribbean countries, Powell (1973:53) observed that all Caribbean countries are short of skilled people in management and in technical fields. He suspected that this lack of suitably qualified human resources may well be the greatest obstacle to successful development. Powell's suspicion is actually supported by some data reported by the Government of the Bahamas. In Census Monograph - No. 1: Manpower and Income (1973b: XVI - XVIII), the Government reported that in 1970 the non-Bahamian labor force made up 24 per cent of the total work force and accounted for 38 per cent of the Bahamas' personal income.

The brief description given above is expected to be sufficient to shed light on the relative position of the Bahamas as a less developed country. It must be made clear at the outset that the human capital theory and the techniques to be employed to evaluate educational investment is not intended to be any different because the country in question is characterized as less developed. But, the result of this study is expected to shed some light as to whether or not investment in education in the Bahamas has returns similar to those reported in other studies. This study is based on the view that more studies on rate-of-return on education in less developed countries are required to judge the value of the evaluation techniques for educational and economic planning. Bowman (1962:114) expressed this sentiment when she wrote:

> The repetition of static studies of rate-of-return pattern in one after another setting begins to fill in a picture of the moving scene, just as multiplication of camera still shots creates a movie.

Before turning to the problems, delimitations, assumptions, and significance of this study, an overview of educational planning approaches is presented below to establish the place of the rate-of-return approach in the overall educational planning.

OVERVIEW OF EDUCATIONAL PLANNING

Dror (1963:50-52), Anderson and Bowman (1964:5-6), among others, stated that educational planning is nothing more than the process of preparing a set of decisions for future actions pertaining to education directed at achieving goals. In other words, planning is a process by which alternative future courses of action, which will lead to the accomplishment of objectives, are defined, evaluated and selected. Kornai (1975:28) observed:

> ...the purpose of the plan is to solve the conventional neoclassical problem of resource allocation, with scarce resources to be allocated. It does not matter whether this is done in the framework of a firm, or a competitive market economy, or a developing country. All cases are alike since the crucial problem is always the same: the efficient allocation of scarce resources.

The kind of educational planning utilized or applied depends very much on the situation and orientation of the planners as to whether one focuses on education for education's sake, or whether one considers education as a means to other development. These two basic schools of thought become obvious as the lists of planning approaches and their brief descriptions indicate below.

(a) Social Demand. This planning approach is normally employed to meet the private demands of education. Carnoy (1972:205) stated that the plan assumes that everyone wants more schooling so that the role of government would be to meet the wants as rapidly as possible. This planning approach is specifically concerned with the future needs for schools, teachers and other school inputs based on population growth and a desired rate of student enrolment.

(b) Manpower Requirement Approach. Carnoy (1972:206), Blitzer (1975;177), Anderson and Bowman (1964:20), Benson et al. (1974:248-250) and others stated that this approach derives labor demands as functions of economic output levels through fixed coefficients. The fixed coefficients include the relationships of output of goods and input of skills, and the number of years of schooling and skills. In manpower planning, the structure and needs of the economy are taken as given so that the planning is primarily done to "oil the gears" of the country's economy with a supply of skilled labor. It is assumed that no substitution among the various labor skill types exists. Technology is assumed to determine the relative mix of occupations in each sector, and relative real wages have no role in the process.

(c) Simple Correlation Approach. In this approach, an educational activity, such as enrolment, is correlated with GNP per capita. Koulourianos (1967:37) stated, "This approach to the problem of the economic contribution of education consists in correlating variables representing educational activity with variables reflecting economic performance." One example of this approach is the work of Harbison and Myers (1964) who correlated the stock of educated manpower with the economy in 72 countries to find the coefficients and, equally important, to compare the relative economic positions of the countries involved. The work of Schultz (1968) who studied the share of resources devoted to American education to see the relationship of education and economic growth also falls into this category.

(d) The Residual Approach. This approach assesses the total increase in economic output of a given country over a period of time, taking into account the impact of measurable inputs; namely, capital and labor, and attributing the residual output to unidentifiable inputs. One of the most important inputs is assumed to be human capital. The work of John W. Kendrick, in which he covers the period from 1889 to 1957 on the growth of some industries in the United States, and the work of Denison (1962), in which he studied the United States GNP growth rate between 1929 & 1957, are examples in this category. The work of Denison is especially significant because he estimated the contribution of each production factor, including education, to the growth of the GNP. Koulourianos (1967:67-69) stated that Denison approached the problem of the economic contribution of education from the return side by estimating changes in labor productivity due to additional schooling.

(e) The Cost or Investment Approach. This approach is very similar to the residual approach of Denison. In this approach the estimate of educational stock of the labor force is made in cost terms and is matched "with a rate-of-return to get the contribution of education to growth" (Koulourianos, 1967: 70). The work of Schultz (1968) falls in this category. Schultz studied the educational stock of the labor force in the United States between 1929-1957, by costs involved to educate the labor force, and matched this cost with the Gross National Product to find the returns to education or to get the contribution of education to economic growth. Koulourianos (1967:72) observed that this educational stock is a kind of human capital created by education and evaluated by its cost of production.

(f) Rate-of-Return. This approach is used to assess the economic value of education by estimating the economic gains to society and/or individuals. The model contrasts the future lifetime earnings of less educated with people of greater educational attainment. Koulourianos (1967:37) stated:

> Net economic gains are given by the rate-of-return from education which, beyond the earnings differentials, takes into account the cost involved in obtaining a given amount of

> education. In estimates of this nature, three factors are important: total return from education, the cost to acquire that education, and a time discount rate....

In the rate-of-return approach, it is assumed that there is infinite substitution of skills at rates reflected in the assumed wage structure. Blitzer (1975:188) stated that in the rate-of-return the assumption of substitutability of skills is derived from the assumption that wages, either market wages or social marginal products, are given for each occupation.

The rate-of-return approach, which is the subject of this study, will be dealt with in Chapter III. As has been seen above, the rate-of-return is recognized as one of the planning tools used to evaluate the value of education, even though most writers do not seem to agree whether or not to define it as strictly a separate planning tool or as a part of the long established categories, namely, social demand and manpower requirement approaches. For example, while Anderson and Bowman (1964) placed the rate-of-return under the manpower requirement approach, Blaug (1967) placed rate-of-return analysis under social demand approach.

The planning model discussed above and others have both advantages and disadvantages. It must be noted that one is not necessarily the substitute of the other. For example, the contrast between manpower planning and rate-of-return always seems to indicate that one is supposed to be more preferable than the other. But the issue is rather different. They are in some cases contradictory, but in most cases supplementary. In the words of Richard Perlman (1973) the rate-of-return and manpower projection do not even deal with the same issues. Richard Perlman (1973:67) wrote:

> The rate of return method provides the ... means of deciding the efficiency of investment in human capital (education) compared to physical capital, based on the comparison of internal rates of return and alternative opportunity - cost rates, and its analysis could be applied to economic efficiency in maximization of net return - for particular fields of study. The manpower-forecasting approach does not even address these problems.

Among the approaches identified above rate-of-return, residual and investment approaches are usually considered as tools to evaluate the economic value of education. However, the correlation analysis, which is designed to investigate the relationship between education and economic variables, does not attempt to assess directly the economic value of education. All the other three approaches treat, in one way or another, earning differentials and education costs to compute the rate-of-return. Koulourianos (1967:80) said that while the residual and cost or investment approaches assess the economic contribution of education to economic growth, the rate-of-return approach is primarily concerned with the allocation of resources.

STATEMENT OF THE PROBLEM

The focus of this study is the male labor force of the

Bahamas who have had general secondary education, that is grades 7 to 13 inclusive. Specifically, the study is intended to answer the following question:

What are the private and social present values, and internal rates-of-return, of the marginal earnings streams for the Bahamas male labor force on the private and social investments in general secondary education?

The above problem is broken down into three sub-problems which will be used in the investment analysis of the Bahamas general secondary education.

Statements of Sub-Problems

Sub-Problem 1: Social and Private Costs of Secondary Education

Sub-Problem 1a. What are the estimated social costs of investment in general secondary education in the Bahamas?

Sub-Problem 1b. What are the estimated private costs of investment in general secondary education in the Bahamas?

Sub-Problem 2: Social and Private Present Values of Net Benefits

Sub-Problem 2a. What are the social present values of the marginal earnings streams, when discounted at selected rates, of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

Sub-Problem 2b. What are the private present values of the marginal earnings streams, when discounted at selected rates, of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

Sub-Problem 3: Social and Private Internal Rate-of-Return

Sub-Problem 3a. What are the social internal rates-of-return of the marginal earnings streams of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

Sub-Problem 3b. What are the private internal rates-of-return of the marginal earnings streams of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

DELIMITATIONS

This study is delimited to the following areas:

1. The study is restricted to the study of private and social costs and benefits of secondary education in the Bahamas.

2. The study is restricted to male workers who have had 7 to 13 years of education.

3. The study utilizes the cross sectional population census data of 1970 for analysis of benefits. The costs of

secondary education are estimated from educational expenditure records and sample surveys of four Government and four Independent secondary schools in New Providence.

4. The focal year for the investment analysis is 1970, the year the population census data were collected and compiled in the Bahamas.

5. The following investment analysis models are used:

   (a) Present value of net benefit

   (b) Internal rate-of-return

The above two models are tested by using different discount rates, prevailing employment rates, Alpha coefficient of 60 percent, and economic growth of 2 percent.

ASSUMPTIONS

The following assumptions are made in this study of rate-of-return on secondary education:

1. Education is an investment in human capital.

2. At the date of compulsory retirement or death the human capital loses its monetary value.

3. All secondary education costs are assumed to be investment.

4. Cross-sectional data based on census of population are assumed to provide adequate information on earnings by age and education.

5. Physical and human capital are conceptually similar requiring similar analytical techniques.

SIGNIFICANCE OF THE STUDY

With the exception of Canada and U.S.A., studies on the economics of education tend to be based on samples of urban population and/or on samples of a given economic sector in a country. The primary reason for this restrained approach is the lack of nationwide data in regard to earnings by education and age and other characteristics of the labor force in any given country. Consequently, the results of these studies have limited applications and minimal value for international comparison. In the case of this study, the Bahamas census of population which was conducted in 1970 provided the necessary information on earnings and age structure of the total labor force making the study of rate-of-return possible for the country as a whole. Thus, this study becomes one of the few which may shed some more light on the investment in education viewed from the national perspective of a developing country. More studies of this nature need to be carried out to ascertain the applicability of the rate-of-return as a planning tool for education in terms of its monetary value. As Lee Hansen has said, the studies of rate-of-return in different countries facilitate international comparison in order to determine what generalization may emerge from the results. Hansen (1977:241), after reviewing the works of Psacharopoulos (1973), who attempted to synthesize 53 studies in 32 different countries, and others, observed:

> As additional data become available to permit

> calculation of rates of return for several different years for each country, it will be possible to draw conclusions about the relationships between changing stocks of educated persons and the economc returns to different levels and types of education.

Hence, the purpose of this study is to increase the information on the application of the rate-of-return on education which may be used by both society and individuals in making decisions about the amount of investment on education. Obviously, the economic information alone is not sufficient for making certain decisions about education. Other factors, such as social and cultural development are important objectives of education in a given country. But in this study, the economic aspect of education is emphasized with the view that finding the optimum allocation of scarce resources is a crucial issue in educational planning.

For this study secondary education was selected because of the following reasons:

1. In most less developed countries, students are confronted with the decision at the end of primary education whether or not to continue their education at the secondary level or seek employment. The decision to continue is primarily influenced by the economic benefit of secondary education.

2. Secondary education in less developed countries is the primary source for most trained manpower. Consequently, most of these countries attempt to plan to meet their trained manpower needs through secondary education.

Both the above criteria are the basis for the selection of secondary level. In the case of the Bahamas, the secondary school level falls into two categories: (a) Grades 7 through 9 are covered by compulsory attendance laws, which stipulate that every child up to the age of 14 should attend school;[3] (b) Grades 10 - 13 are open for those students who meet the entrance examination, and the attendance is voluntary on the part of the students. This study focused on all secondary education, grades 7 - 13 inclusive.

DEFINITIONS OF SELECTED TERMS

The definitions given below in alphabetical order specify the meanings of selected terms as used in this study.

Cost-Benefit/Rate-of-Return Approach. Both terms refer to the statistical summary describing the relationship between costs and benefits associated with a given project, in this case, secondary education. They are indicators assessing the economic value of expenditure on education, taking a long term view of the relevant costs and benefits.

Discount Rate. This is the rental cost of money, defined in terms of a time unit of one year. It is a rate employed to bring the future to the present.

Earnings/Income. In the case of the Bahamas, both terms refer to payments for production such as wages and salaries, income from self employment and rents, dividends and interests.

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[3] See Annual Report 1970-71 p.8, prepared by the Ministry of Education and Culture, the Commonwealth of the Bahamas.

Earnings Stream. This is a year by year flow of earnings over a period of time.

Economically Active Population. In the case of the Bahamas, the term refers to all persons aged 14 years and over on the basis of employment situtation in the six months before the 1970 census date. The employment situation includes: (a) the employed, (b) the unemployed who are actively seeking jobs, and (c) the unemployed due to temporary illness.

Foregone Earnings. This is the value of the time that students allocate to schooling. That is, it is the income that the average student could have expected to earn had he been employed instead of attending school.

Income. See earning/Income.

Income Differential/Marginal Earning. Both terms refer to the extra or additional earnings associated with additional education. They refer to the earning difference between those who have higher and lower education.

Interest Rate. This is the rental cost of money defined in terms of a time unit of one year. It is a rate used to project the present to the future.

Internal Rate-of-Return. This is a discount rate that makes the sum of earnings stream equal to the sum of costs. It is also defined as a discount rate that makes the present value marginal costs and earnings equal zero.

Investment. This is the allocation of available resources, which have an alternative production use, to an educational activity whose benefits accrue over the future. Investment is also defined as an addition or an increase over some time period to real capital stock.

Marginal Earnings. See income differential/marginal earning

Market Imperfection. This is a state of inequality between wages and marginal productivity.

Opportunity Cost. This refers to the foregone earnings during schooling and a lifetime income foregone as a result of entering a labor market with a higher level of education.

Present Value. This is the value of money obtained by discounting costs and the future flow of earnings to the present.

Private Benefit/Return. Both terms refer to the value of money obtained on investment in education which accrues to an individual.

Private Cost. This is a cost incurred by an individual and/or his family on education.

Private Rate-of-Return. This refers to the internal rate-of-return on investment based on the private costs and returns.

Rate-of-Return-Analysis. See cost-benefit analysis.

Residual/Unexplained. Both terms refer to the measured increase of national income that exceeds the increase in measured resource inputs.

Social Benefit/Return. Both terms refer to the value of money obtained on investment by society which adds to the national income of society.

Social Costs. This is the total value of costs incurred by society on education.

Social Rate-of-Return. This refers to the internal rate-of-return on investment that accrues to society based on social costs and benefits.

Return. See private and social benefit/return.

Unexplained. See residual/unexplained.

ORGANIZATION OF THE THESIS

In this chapter the perspective of rate-of-return within the context of educational planning, the research problem, the significance of the study, and the definitions of selected terms, have been discussed to establish the direction of this study.

Chapters II and III deal with the theoretical background of human capital and the development of the conceptual framework employed in this study, respectively. The topics in Chapter II include the historical development of human capital theory; investment in education in which the similarities and differences of human and physical capital, and the investment and consumption aspects of education are discussed; and conceptual issues of human capital. The topics in Chapter III include rate-of-return analysis and its components, costs and benefits, and factors other than education that affect earnings. Moreover, pertinent empirical findings in different countries are presented in Chapter III to help set up the conceptual framework for this study. Finally, the conceptual framework is developed showing the different adjustments employed in the research.

Chapter IV deals with the research design and methodology in which population and selection of instruments are discussed. In Chapter V, the methods of collecting and compiling the costs and benefits data are dealt with. Chapter VI deals with the analysis of data in terms of the sub-problems identified in Chapter I. The final Chapters, Chapters VII and VIII, bring together all the important aspects of the previous chapters. Specifically, the two chapters deal with the summary of the study, discussion on findings, conclusions, and implications of the results.

CHAPTER II

THEORETICAL BACKGROUND OF HUMAN CAPITAL

In this Chapter, the theoretical basis of human capital is discussed to establish the essential properties that support the proposition that human capital is one of the important input factors for the production of goods and services in any country. The topics included in this chapter are: (1) historical perspective; (2) investment in human capital which is divided into (a) human versus physical capital, (b) investment and consumption aspects of education, and (c) unresolved issues.

The similarities and differences of human and physical capital are compared to provide the basis for the use of cost-benefit analysis to evaluate the economic value of education. Morevoer, the investment and consumption aspects of education are discussed to establish the premise on which the economic analysis of education depends. Finally, the unresolved conceptual issues of human capital are identified and discussed. These issues are provided to indicate that human capital theory has some weaknesses which need to be kept in mind when interpreting the analysis of relevant data. The above discussions are brought together and summarized at the end of the Chapter.

HISTORICAL PERSPECTIVE

The economics of education was recognized by some classical economists such as Adam Smith, who observed that educational expenditures can be considered as capital formation. However, the prevailing attitude of society prevented the economists from treating investment in man as one of the production factors. Thus, until recently, the purpose of education was thought to be simply to transmit sets of values to members of society. This objective still holds but it is not the only one. Most countries today include social and economic development as part of educational objectives. The inclusion of the economic objectives is due to the influence of present day economists who persisted in expressing their views, supported by empirical studies, that established the economic value of education.

Marshall (1920), who was influential in the study of capital formation, insisted that human beings could not be treated as capital in practice because human capital is not traded in the market place. To avoid the dilemma, Marshall conceptualized capital as being applicable only to the manmade, non-human material stock of wealth directly used for production. In other words, Marshall did not consider expenditure for education as investment. He did, however, recognize the importance of education as a factor in human progress. Marshall (1920:212) stated:

> There is no extravagance more prejudicial to the growth of national wealth than that wasteful negligence which allows genius that happens to be born of lowly parentage to expend itself in lowly work.

Even though some empirical studies were made in early 1920 in Russia by Strumilin (1964), and in the United States in 1930's by Walsh (1935), the economics of education did not come to be recognized until after T.W. Schultz's presidential address to the American Economic Association in 1960. In his address, Schultz observed that human capital formation is a very important aspect of economic development. He went on to suggest that economic advancement of any country depended to a great extent on its stock of human resources.

Schultz (1968:14) argued that economists shied away from the concept of human capital not because of lack of knowledge of its role in economic development, but because of the "deep seated moral and philosophical issues", which meant that free men are not property or marketable assets, and that they are the end to be served by economic endeavor. Schultz (1968:16) added that knowledge and skill are part of investment and, combined with other human investments, account for the production superiority of the advanced countries. Schultz (1968a:18-19) observed: "The income of the United States has been increasing at a much higher rate than the combined amount of land, man-hours worked, and the stock of reproducible capital used to produce the income".

Furthermore, the rapid economic recovery of some countries from the devastation of the Second World War, which left physical capital in a mass of rubble, was very puzzling to economists because the standard economic analysis failed to identify the production factors responsible for the recovery. In other words, the recovery and the growth of various national economies were found to have exceeded the investment increases in physical capital, which lead to the speculation that human capital could be the factor for the deviation.

Koulourianos (1967) observed that even though education is not carried on for the sake of production of goods, one can hardly deny its significance to the economy of any society and its contribution to its welfare. He stated that the main reason why economists shunted aside this human activity seems to be a kind of moral timidity. Koulourianos (1967:29) wrote:

> The prevailing philosophical ideas and attitudes, strongly influenced by the protests against the economic exploitation of people and the evils of slavery, discouraged any economic assessment of an "industry" identified with man, lest the human beings be debased to the level of material goods with which the economists were presumed to deal.

Koulourianos explained that continuous social and economic upgrading of workers has gradually removed these fears.

Other authors, such as O'Donoghue (1971:1) said that the growing interest in the economic aspect of education during the 1960's was due to:

> (a) Considerable growth in the volume of educational activity to the point where today education is one of the largest industries in most countries and also one of the chief employers of highly skilled personnel.
> (b) The recognition that education may have a significant influence on the employment and income opportunities open to people and hence affect the distribution of income and wealth in society.
> (c) The post-war emphasis on economic growth and development, with education playing an important role as the provider of skilled personnel for an economy.

On the other hand, Johns and Morphet (1975), Kern Alexander (1976), and others observed that the earlier view of human resources was merely "labor intensive" rather than "brain intensive", and production required more muscle and bone than brains. Alexander (1976:430) stated that as society advanced, the concept of human capital was a natural development. Alexander (1976:430) declared:

> Today human resources- not capital, nor income, nor material resources- are looked upon by some as the true basis for the wealth of nations. Physical capital and natural resources of a country are passive factors contributing to production, while human beings are the catalytic agents in producing capital, building social, economic, and political organizations, and promoting natural development. Human resources are the energies, talents, skills and knowledge which can be applied to inert physical factors to produce goods and services, and to produce additional human resources.

Schultz (1968:18-20), after analyzing the phenomena of American economic growth, identified three so-called puzzles:

1. Human capital has been increasing at a rate substantially greater than reproducible (nonhuman) capital.

2. Income has been increasing at a much higher rate than the combined amount of land, man-hours worked, and the stock of reproducible capital used to produce the income.

3. The human capital component has become large as a consequence of human investment.

The third proposition is what interests most economists to search for empirical evidence. Psacharopoulos (1973:1), Blaug (1970:XVII), and others said that the discovery of this third factor referred to as 'residual' or 'technical knowledge' or 'shifts of the production function' or 'coefficient of our ignorance' has helped to adapt economic concepts and techniques in the field of education to analyze the profitability of education. In effect, the economics of education has now become a branch of economics.

The works of Schultz (1960), Becker (1964) and Denison (1962) have helped to popularize the concept of human capital and encouraged the inquiry into the field. Bowman (1966:42) referred to this new field of inquiry as ". . . a synthesis of important older elements in economics, a forging of new tools, an opening of fresh vistas, and also the ground on which sharp battles are waged among different schools of economists."

INVESTMENT IN HUMAN CAPITAL

The concept of human capital refers to the concept of people investing in themselves in expectation of future returns. Human capital is the produced skills and capacities embodied in man for production activities. To this effect, Hansen (1967:30) stated:

> By this, economists mean that certain types of activities augment the stock of human knowledge and skills, and thus can usefully be classified as investment activities. This stock of knowledge and skills that becomes embodied in humans - human capital - yields a future output or income stream during the lives of the individual recipients of these educational investments. . . .

Relating to productivity, Rodriguez and Davis (1974:32) said that education functions to improve the quality of human effort, thereby enabling society to realize increased output per man-hour. Rodriguez and Davis (1974: 32-36) affirmed that knowledge and skills do have economic value and are indispensable to a society attempting to achieve a high level of economic activity. They said that when society spends funds for schools to educate its youth, it is investing in human capital. Furthermore, Walter Krause (1961:87), another economist, was equally emphatic when he said:

> Assertedly education, . . ., is useful as one part of a program of development in that it can enhance the productive capacities of the population, can help spark imagination and spur incentive, and can help dissolve impediments associated with cultural rigidity.

In the same fashion, Blaug (1976:829) said that the 'hard core' of the human capital analysis is based on the idea that people spend on themselves in diverse ways mainly for the sake of future pecuniary and non-pecuniary returns. Sahota (1978), Schultz (1960), Mincer (1962), and others commented that these diverse ways of expenditure could be in the form of (a) human migrating, (b) improving human health, (c) schooling, (d) on-the-job training, (e) job searching, (f) information evaluating, and the like. Many others, such as Taubman and Wales (1975), Becker (1964), and Denison (1962) wrote that the proposition of treating education as an investment in human capital is found to be illuminating in its own right as a major ingredient in studies of the sources of economic growth and income distribution.

The treatment of human skill and knowledge within the framework of capital theory, which was largely developed by Schultz, Dension, Griliches, Becker, Mincer and many others after them, is now claimed to have enriched all branches of economic analysis, including labor economics, capital theory, growth theory, and income distribution theory. Sahota (1978:11) revealed that the human capital research followed two complementary fronts. He said that Schultz, Dension, and Griliches, and others after them used the human capital framework to analyze the sources of productivity and economic growth, whereas Becker and Mincer focused on the general theory and earnings distribution theory of human capital. Sahota (1978:11-12) added that the hallmark of human capital theory

> ...is its postulate of optimizing behavior on the part of individuals: investment in oneself is the result of rational optimizing decisions (...) made on the basis of estimates of the probable present value of alternative life cycle income streams, discounted at some appropriate rate.

Koulourianos (1967) explained that the education problems that have attracted the attention of economists can be divided into two groups. The first problem pertains to the economic evaluation of education and its contribution to growth. Koulourianos (1967:9) said:

> Different methods have been proposed that are meant to measure the contribution of schooling to economic growth and to estimate the returns on investment in education. Furthermore, the educational needs of the economy are analyzed under different assumptions on the substitutability among various groups of the labor force and among different factors of production.

The second problem pertains to the financing of education in regard to the issues of fees, grants-in-aid and taxes of different kinds. To this effect, Koulourianos explained that the question of who must pay for education, how much, and in what way, cannot be resolved by economic reasoning alone. But, Koulourianos (1967:10) observed, "Economic analysis, however, can help in solving these problems by estimating costs and gains, and indicating beneficiaries."

Bowman (1968:247) provided two dimensions in the analysis of human capital. She separated human capital as a store and as a current input into production. As a store, capital will be something from which future yield can flow, the value of which will depend on the size per year and the length of period over which the flow persists. Bowman stated that a college graduate with a perspective of 45 years earning life is more capital as a store than a college graduate whose income life is less. She added that the contribution to production of both men for a given year, as a current capital input, will not be different in their capital value. She also indicated that a year of elementary education is not the same economically as a year in college.

Schultz (1968:21), on the other hand, divided human resources into two dimensions based on his observation of the United States labor force. The dimensions he identified are:

1. Quantitative - that is (a) number of people, (b) proportion who enter useful work, and (c) hours worked.
2. Qualitative - that is skill, knowledge and similar attributes that affect particular capabilities to do productive work.

Both the above distinctions of human capital are important in the analysis of rate-of-return on educational investment both from the standpoint of individuals and the society at large.

The above brief review of the background on the economic value of education provides the basis for the rationale for the concept of human capital and consequently for the rate-of-return approach. The rationale and assumptions are outlined in the following paragraphs.

1. Blaug (1970:XVII-XVIII) declared ... "the acquisition of education in a modern economy provides opportunities for individuals to invest in themselves; ... and these private decisions are profoundly influenced by expected economic returns". This assumption opens the door to (a) an economic analysis of the private demand for education, and (b) formulation of economic criteria for the collective provision of educational facilities.

2. Blaug (1970), Sheehan (1973), and others stated that education, like any economic activity, uses a certain proportion of society's scarce resources which could have been used elsewhere. Therefore, education is one type of investment competing for the limited resources available in a given country. These conditions require a justification for the expenditure on education.

3. Vaizey (1968), and Hansen (1968) stated that the analysis of costs and benefits of education has universal application. It helps individuals and/or society to decide which programs are more effective economically, and what priority education should receive in relation to other demands upon public and private resources.

4. The following three assumptions were among those identified by Dibski (1970:49) and Wilson (1970:8):

a. Human capital formation and physical capital formation are conceptually similar and may be analyzed by similar techniques.

b. Cash flows in human capital analysis are adequately measured by direct monetary costs and returns.

c. Education is a measure of productivity and hence of earning potential. Private marginal earnings arising out of improved educational qualifications represent marginal productivity.

The assumptions given above and other similar ones are fundamental to the study of the economic value of education as investment. Solow (1963:16) explained that the central concept in capital theory should be the rate-of-return on investment. This view does not suggest that educational expenditures do not have consumption aspects. Hansen (1967:30) pointed out that economists who view expenditure on education as an investment do not deny the existence of consequential consumption aspects. He stated that there is no necessary conflict between the investment approach and the more traditional approach to education because both complement each other. Blaug (1974:17) expressed similar views when he said that educational objectives include economic, social, cultural and political aspects, but cost-benefit analysis is concerned only with the economic objective.

In the foregoing discussion, two basic issues, namely physical versus human capital, and investment versus consumption aspect of education, were raised in one way or another. Since these two issues are important in relation to the concept of human capital and its components--costs and benefits--they are further discussed below.

Human Capital Versus Physical Capital

As indicated earlier, physical capital is a produced good which can be used as input for further production. Similarly, human capital is defined as a produced stock of skills and knowledge which can be used for productive purposes. In other words, physical capital and human capital are conceptually similar. Education is assumed to be an investment in a potential source of income. But human capital is also different from the physical capital because the capital yielding future income is embodied in human beings. Schultz (1971:48) explained this distinction when he said:

> The distinctive mark of human capital is that it is a part of man. It is human because it is embodied in a man, and it is capital because it is a source of future satisfactions, or of future earnings, or of both. ... It can, of course, be acquired not as an asset that is purchased in a market, but by means of investing in oneself.

Schultz (1971), Shamsul Hug (1975), Blinder and Weiss (1976), Becker (1967), and others indicated that the control of human capital is perhaps the most important feature that distinguishes human capital from physical capital. Shamsul

Hug (1975:67) remarked that the control over human capital remains vested in the individual embodying the capital, regardless of the sources of investment. In addition, since the property rights to human capital cannot be transferred, the finiteness of life plays a central role in human capital investment.

Because of the conceptual similarity of human and physical capital, the tools employed to evaluate physical capital were also employed to evaluate human capital. But the tools employed assume the existence of certain economic conditions. O'Donoghue (1971) argued that the accepted framework for analysis of individual economic sectors was that of the competitive market economy. He speculated that the neglect of human capital could have been due to the absence of a satisfactory analytical framework within which to conduct an economic analysis of education.

In competitive systems, the forces of supply and demand are expected to result in the most efficient pattern of production and consumption for any commodity. It is assumed that buyers only pay the value they place on the item in question, while sellers will not accept prices that do not cover their costs. There will be no over-production or under-production in the competitive market system in the long run. O'Donoghue (1971:2) observed, "Competition would determine the correct quantity and price for all goods and services available in the country." O'Donoghue (1971:2) went on to state,

> Given the competitive model as the analytical basis, the normal pattern for the study of any one industry or sector would be to examine demand and supply patterns, the development of the industry, its relationship with other industries, and other points of interest in terms of whether they resulted in an adequate degree of competition; and, if not, to identify imperfections in the competitive system, with a view of eliminating them.

O'Donoghue (1971:2-3) said that it is possible to analyze education in a similar fashion, exploring such questions as whether parents and pupils had adequate information of the costs and quality of education provided by various schools, whether there was an adequate range of educational establishments available, whether there was freedom of entry for those seeking to open new schools in the same way as one might look at the shoe factory for example. But education in most countries, for that matter most economic sectors, is not sold and bought on competitive market basis. It is usually financed and operated by government and/or philanthropic agencies. As can be seen below the uncompetitive nature of education is not unique.

O'Donoghue (1971:4) stated that there are (a) non-economic, and (b) economic reasons which are used by governments to intervene in normal competitive economic systems. On non-economic grounds, modification of the system could come about for humanitarian reasons. Furthermore, governments may intervene to modify the pattern of resource allocation on political grounds. For example, while the competitive system may call for an importation of a commodity, a government may decide to produce that commodity within the country by providing a subsidy. Both of these examples show that the competitive market system in its ideal form does not exist in most countries. O'Donoghue (1971:4) observed:

> While a marxist might deny the validity of these non-economic motivations, most economists accept that economic man is a fiction (of non-economist) and recognize that many forms of governmental activity will arise from this conflict.

On economic grounds, O'Donoghue (1971:4-5) identified the following reasons why governments tamper with the market economy.

(1) Technical Characteristics of a Particular Industry. In certain areas of economic activity, a monopoly could be found to be the cheapest or the appropriate form to provide supply. Distribution systems of telephones, electricity, gas and water are examples which are most efficient as a monopoly.

(2) Joint Consumption. Joint consumption does not allow the provision of the goods and services through the normal competitive market because it is almost impossible to exclude anyone from sharing the consumption. A standard example of joint consumption is the military establishment of a country.

(3) Incomprehensiveness of the Economy. This category,

which is assumed to create problems for the market system to operate normally, refers to economic activity that does not embrace all costs and benefits, so that certain resources and/or outputs are unpriced. A standard example is air and water pollution from a factory.

Some of the reasons given to explain the absence of ideal competitiveness can be applicable to education.

1. In terms of non-economic reasons, government intervention in education has been justified on the grounds that education is a desirable thing by itself, regardless of its economic value. Compulsory education in many countries is based on this reasoning.

2. There is divergence between the private and social valuation of educational costs and benefits. For example, while the educated persons may raise the productivity of their co-workers, the cost of education might be imposed by educated persons on the rest of the economy (O'Donoghue, 1971:7). These externalities, whatever form they take, constitute one of the reasons for educational activities to be under the domain of public sector and/or public intervention.

3. Education is seen as one of the factors related to the distribution of income. A government may attempt to correct inequities in income through a policy to provide widespread educational opportunities.

4. Education is an activity demanded by most people in any given country. But school facilities and programs may not respond to the needs of the population. Yet, such schools rarely disappear from the scene regardless of their shortcomings. This characteristic of education constitutes one of the reasons for the absence of competitive market in education.

The brief overview of the conditions under which educational activities take place suggests that education is no different from those economic activities assumed to operate under competitive market system. O'Donoghue (1971:7-8) observed:

> In this respect, education is not unique since similar complexities arise in many other areas. One purpose which economists have in seeking to identify the various forces at work in any given area is to help in arriving at an adequate description and understanding of them.

O'Donoghue (1971:8) added that the identification of these problem areas lead to a wider recognition and acceptance of the necesssity for intervention of governments in the market economy. O'Donoghue (1971:8-9) advised that if the "ideal competitive world is not available, it is necessary to examine and compare the various 'second best' positions which may be possible in reality."

The foregoing discussion contrasting education and other economic activities bears out the conceptual similarities between human and physical capital, which justifies the use of traditional analytical tools of economics to evaluate the economic value of education.

Investment and Consumption Aspects of Education

Schultz (1968:22) stated that any expenditure could be conceptualized as falling in one of the following three categories:

(a) expenditures that satisfy only consumer preferences (pure consumption);

(b) expenditures that enhance capabilities and do not satisfy any preference underlying consumption (pure investment); and,

(c) expenditures that have both consumption and investment effects.

Education falls to the third category, and thus it is assumed that education has both investment and consumption components. Based on this concept, Schultz (1971:53-54) divided education into: (1) education for current consumption; (2) education for long period future consumption, making it an investment as an enduring consumer component; and (3) education for skills and knowledge useful in economic endeavor and, thus an investment in future earnings.

Of the three classifications given by Schultz, only the third one is assumed to be reflected in earnings as a result of investment. The other two can be classified under consumption for the fact that they involve expenditures on the part of an individual to get some psychic returns. As Rogers and Ruchlin (1971:151) pointed out, education is inherently pleasant and once acquired it enables one to achieve greater appreciation and enjoyment in such things as music, art and literature.

This categorization of education expenditures is not reflected in most studies on the economics of education. That is, the cost of education is not adjusted for consumption because of the difficulty of separating the cost into its consumption and investment components. But Schultz (1971:101) stated that to gauge the increase in human capital and its contribution to economic growth entails "allocating the costs of education between consumption and investment, determining the size of the stock of human capital formed by education, and ascertaining the rate of return to this education."

Some other authors proposed a different approach in the conceptualization of the cost of education to resolve the dilemma of consumption and investment. For example, Sheehan (1973:22) stated:

> ...education is clearly an investment good in as far as it enables people who produce it (or participate in it) to derive a future stream of benefits, whether in the sense of the income benefits from jobs that they may acquire by virtue of their education, or whether in the sense that society, by providing education, enables educated members of the labor force to add to society's output of goods and services in the future.

In Sheehan's view, the question of consumption and investment is resolved by mere observation of the measurable and direct benefits of education.

The different assumptions given by different people are used in one way or another to study the contribution of education to economic growth. Depending on the assumption one makes, the contribution of education could be underestimated or overestimated. That is, if all costs of education are considered as investment, the economic value of education could be underestimated. On the other hand, arbitrary reduction of costs intended to reflect the cost of consumption could cause an overestimate of the economic value of education. This dilemma of under and over estimation of the economic value of education is further discussed in Chapter III.

The above discussions on expenditure in education for economic reasons, the similarities and differences of human and physical capital as a basis to employ traditional economic tools to evaluate education, and the concept of educational expenditure as having both investment and consumption components serve as the core of the theory of human capital. However, there are other conceptual issues that are yet unresolved in human capital theory. These issues are discussed below.

UNRESOLVED CONCEPTUAL ISSUES

Regardless of assertions of the need to include human capital in the analysis of a nation's wealth and economic growth, and of its economic value to individuals, there are some people who maintain that both the concept and measurement of human capital need to be questioned. These critics of the concept of human capital can be classified into three categories:

(a) Those who support the concept but who are conscious of the shortcomings;

(b) Those who disagree with the concept on the grounds that the variables associated with it are complex and cannot be measured; and.

(c) Those who disagree with the concept on ethical grounds.

The above three observations are discussed below.

Shortcomings of Human Capital

Sahota (1978), in his survey of literature on the theory of personal income distribution, reviewed the views expressed by various authorities on human capital theory. Sahota (1978:14) observed, "While there is little doubt that the human capital theory of income inequalities will go down in economic history as a turning point in general economic theory, its critics point out several shortcomings in it." From his survey and synthesis, Sahota identified the following shortcomings of human capital theory.

Objection 1 - The discounted value maximization behavior is too far-fetched. The issue here is the concept of maximization of the present value of life-cycle earnings. Sahota (1978:14) explained, "With any reasonable discount rate, it may be argued, a lifetime income is really just the discounted present value of an income stream of about a dozen years". That is, Sahota suggested that it would have been better to forecast an expected annual salary in the first relevant years or period after the termination of major human investment and indicate a cumulation of annual amortization of costs at a rate of interest expected to prevail in the foreseeable near future.

Objection 2 - The human capital theory postulates education as a source of earnings but the analysis of investment does not deal with the sources of the causes of human investment. Sahota (1978:15) observed that the main body of human capital theory has not come to grips with direct and indirect effects of such factors as family environment, preschool investment, informal education and the like. On the other hand, the influences of factors such as ability, family background, and opportunities on earnings are unresolved. Referring to the recent studies by Griliches (1977), Griliches and Mason (1972), and others, Sahota (1978:15) observed "that the upward bias in the contribution of investment in human capital due to the omission of ability and opportunities is very low, practically zero." The works of others, such as Taubman and Wales (1975), Taubman (1976a and 1976b) suggest that abilities account anywhere from 5 to 35 percent in income differentials. The results of various studies done so far are inconclusive one way or another.

Objection 3 - 'Human capital' is a partial and piecemeal theory. Sahota said that the human capital theory has been a supply theory. But even some exceptional studies, such as the one done by Becker (1967) treat supply and demand as exogenous. Secondly, the theory is limited to an explanation of earnings and ignores property income which has effects on earnings. Sahota suggested that there is a need for an integrated approach, expecially by integrating the four major skill investments, namely, preschool, informal, school and post school. Sahota (1978: 17) added, "Much work needs to be done in improving our knowledge of the various parts before they can be fruitfully integrated."

Objection 4 - Schooling is merely a screening device. In this screening hypothesis, education is assumed to serve as a signaling device for employers to identify persons with pertinent attributes. In this reasoning, schools are supposed to serve as certification agencies to legitimize inequalities. In addition, some people claim that on-the-job training is more important than the formal education because modern economies are characterized by career ladders in which workers are promoted, fitted or fired on the basis of on-the-job performance in the passage of time. Sahota (1978:18) observed that whatever one claims, the data series available so far does not allow it to verify the effects of education as a screening device and productivity in terms of human capital. But this issue needs to be explained further.

Blaug (1976), after reviewing the works of many authorities on the screening hypothesis of education, indicated, among other things, the preference of employers for educated workers based on educational qualifications. He said that it may be because educated workers possess scarce cognitive skills, desirable personality traits and the like. Blaug (1976:846) added, "But whatever the reason for the preferences, the fact remains that all of these desirable attributes cannot be known with certainty at the time of hiring." He remarked that with this problem of uncertainty, the employer is tempted to treat educational qualification as a screening device. The screening, however, may be considered as being responsible for starting salary, but earnings are correlated not only with length of schooling, but with years of work experience. Blaug (1976:846) explained that the correlation of earnings with length of schooling increases in the first 10 - 15 years of experience, which is difficult to explain by screening hypothesis. Blaug did not think that the human capital and screening hypothesis are in any way contradictory. Blaug (1976:847-48) remarked:

> It is also obvious that the screening hypothesis concentrates itself on the demand side in the labor market, whereas the human capital research program is strong, where it is strong, on the supply side. Thus, it may well be true that the two research programs are complements, not substitutes.

Barry R. Chiswick (1972) dealt with the screening aspect of schooling as well. He said that the characteristic for which years of schooling serves as a proxy have been suggested to be family background, affective behavior, and ability. He stated that it is important to distinguish between schooling as a means of sorting with respect to ability and affective behavior and as a means of changing these traits. Chiswick (1972:152) remarked, "The screening argument refers to sorting. If schooling changes affective behavior or measured ability, and these changes increase productivity, then schooling affects productivity." In as far as family background is concerned, there is evidence to suggest that families' income and education have positive correlation with the child's income, possibly because of the pre-school investment, larger investments per year of labor market experience, and/or purchase of higher quality of education, which are not usually captured by formal years of schooling. Chiswick (1972:153) remarked,

> Thus, the findings that appear to support the view that years of schooling is a means of screening workers by parental background are also consistent with the hypothesis that earnings are a function of human capital, where human capital includes schooling and nonschooling investments.

Chiswick also questioned the co-existence of screening and competition on a basis other than productivity, in which for example it is assumed that a firm would pay large amounts to obtain college graduates when high school graduates are available. Chiswick (1972:154) asked, "Is it possible to argue, with our social attitudes toward productivity and profit, firms would be willing to sacrifice so much profit to engage in this form of discrimination?" On the other hand, Chiswick could not conceive the efficiency of a school system to identify the necessary characteristics of students which employers look for. He said that if the functions of schools were limited only to screening students by their ability and affective behavior without in some way changing them, then it would have been possible to see specialized firms established to provide this service cheaply.

Chiswick (1972) explained that the evidence available suggests that the correlation of amount of schooling with earnings rises with experience for the first 10 years, and then declines. For example, the study made by Mincer (1974) of U.S. population by taking a sample of 1/1000 male workers showed that the correlation of earnings and experience grows up to 12 years of experience and begins to decline. According to human capital theory, the decline is justified on the grounds that post-school investment becomes small compared to earnings as a person ages. Chiswick (1972:157) concluded:

> The hypothesis that schooling's main function is screening by family background, affective behavior, or ability does not seem to be consistent with the persistent substantial wage differential by schooling level over the entire life cycle.

Chiswick may seem to have had very strong words against those who use the screening hypothesis to criticize the human capital theory, but his views and observations are no different from the views expressed by Sahota (1978) and Blaug (1976), who made comprehensive surveys of the literature and research on the topic.

Critique of Human Capital on Theoretical Grounds

Shaffer (1968), who is one of the main critics of the concept of human capital, emphasized that his opposition to the concept of human capital is not related to morality or to the ethical consideration of degrading free men. He said that his opposition to the concept of human capital is based on the following reasons.

1. Any one direct expenditure for the improvement of man is not investment. To the extent that a part of such an expenditure is investment, it is not based on a careful comparison of alternative investment opportunities with anticipated monetary return.

2. Even when it is possible to separate consumption expenditure from investment in man, it is virtually impossible to allocate a specific return to a specific investment.

3. Up to a certain age, education is compulsory and private expenditures are taken out of private decisions, even though some families may spend additional money on their children. It is impossible to separate the consumption and investment part of such expenditures and the return on any incremental expenditure to either the individual or society.

4. The human behavior in investing in education, after the compulsory level, is very difficult to explain. People take higher education for subtle satisfaction rather than the greater financial success.

5. It is unrealistic to establish a cause-effect relationship between income differential and additional education because (a) there is a high positive correlation between intelligence and years of schooling, (b) financial standing of families and children's years of schooling is also positively correlated, (c) there is a possibility that factors such as family ties, area of residence, occupational and cultural level of parents, and health have some influence upon years of school attendance. These factors have a direct bearing on income independent of years of occupational preparation.

Critique of Human Capital on Ethical Grounds

Chamberlain (1969) argued against the concept of human capital, and rate-of-return analysis in particular, from an ethical point of view. He said that all capital is functional, including human capital, once that notion is accepted. He added that this implies that our interest in human beings as capital will only be a concern for the welfare of capital stock in a sense of keeping it in good running order or perhaps updating it to the neglect of the wishes and needs of individuals. Chamberlain (1969:234) stated, "The education process is seen as consisting, in substantial if uncertain measure, as a training ground for the production function."

Even though Chamberlain objected to the concept of human capital on ethical grounds, he suggested that the utilitarian approach to treating persons in societies which border on the subsistence level is understandable. He added that there is no need to maximize output and constrain social programs to a standard of economic efficiency in affluent societies.

The ethical question raised by Chamberlain cannot be dismissed easily. But the intention of human capital and the subsequent use of the rate-of-return to assess the value of the human capital from the standpoint of society and individuals was not designed to treat human beings as simple instruments for production. One could, in fact, argue that knowledge of returns on educational expenditures provides choices and alternatives to individuals and society, which can be considered as being ethical. In the words of Schultz (1968:14), "It is one way free men can enhance their influence". Similarly, Alexander (1976:435) stipulated, "It may be plausibly maintained that more persons would respond to education with economic incentive if they were simply more knowledgeable of the economic consequences of their actions."

The points raised by Chiswick (1972), Sahota (1978), Blaug (1976), Shaffer (1968) and others refer to the limitations of human capital concept for not including all pertinent explanatory variables of earnings. By and large, the critics of human capital were attempting to improve upon the theory and the approach employed to evaluate it.

The issues described in this Chapter were general and indicative of the strengths and weaknesses of human capital theory. Other specific issues are dealt with in Chapter III where the conceptual framework for this study is developed.

SUMMARY

The purpose of this chapter was to identify the central theoretical concept of human capital, especially in regard to its historical development, the conceptual relationship between human and physical capital, and the concept of investment and consumption aspects of education. To complete the picture, the major unresolved issues of human capital theory have been identified and discussed.

Human capital was described as being a capital embodied in man which contributes to the economic growth of a nation and the earnings of those who have invested in themselves. It was pointed out that human beings invest in their education for economic reasons and for other non-pecuniary benefits. In other words, investment in education was recognized as being one of the important factors for earnings differentials and productivity.

The similarities and differences of human and physical capital explored in this chapter indicated the justification for using the cost-benefit analysis to evaluate the economic value of education. Human capital was found to be similar to physical capital in its contribution as a factor of production. The difference between the two forms of capital was explained to be in the ownership and life. While the physical capital can be sold and resold, human capital cannot exist without the person who possesses it.

Moreover, the investment and consumption aspects of educational expenditures were dealt with in order to identify the investment component which is necessary for evaluating the monetary value of education. The arguement was made that the costs of education need to be divided into investment and consumption, there was no clear cut formula to employ for such a process. Consequently, most researchers on human capital assumed the total educational expenditures as investment and thus are bound to underestimate the monetary returns to education.

Finally, the major shortcomings of human capital theory have been identified. While some writers pointed out the futility of analyzing investment in education, most writers on human capital thought otherwise. They ascertained that education has an economic value both to those individuals who obtained it and to society. They argued that whatever discrepancy exists could eventually be corrected. But the existing discrepancies are not strong enough to prevent the evaluation of the economic value of education.

The theoretical background of human capital reviewed in this Chapter is the basis for the development of the conceptual framework in Chapter III.

CHAPTER III

CONCEPTUAL FRAMEWORK

In Chapter II, the theoretical background and some of the unresolved issues of human capital have been outlined. This chapter is a continuation of Chapter II, and deals specifically with the conceptual framework employed in this study. The topics include the rate-of-return, costs and benefits of education, factors other than education that influence earnings, and some findings of pertinent studies to help establish the relationship of the dependent variable, earnings, and the independent variables, such as age, education, sex, and ability. Finally, the guidelines employed in this study are developed.

RATE-OF-RETURN APPROACH

The initial interest in education as an input factor in economic growth has led to a specific treatment of expenditures on schooling as being an investment by an individual in his future earnings. Carnoy (1972:187) pointed out:

> Despite its possible limitations as a planning tool, the treatment of education as an investment in human capital and the rate-of-return analysis associated with it is seen by many economists as the basis of understanding the relationship between education and the economic system.

The rate-of-return approach to education, which was adopted largely by Becker (1964) and Schultz (1960) recognizes that education involves cost outlays, to the individuals and to society, which are expected to produce benefits in a form of higher earnirgs over the working life of those who acquire the education. Advocates of the rate-of-return approach to evaluating education maintain that the relative returns on differing levels and types of education will help individuals and society to make effective decisions on the allocation of educational resources.

Moreover, the interest in the rate-of-return on education is related to the concern for economic efficiency. The goal is making use of existing resources efficiently to augment the quantity and quality of human resource inputs for social and economic development. Hansen (1970:138) observed that even though the need for a better educated and trained labor force was apparent, the study of Denison (1962) who attributed a good part of the unexplained (residual) part of economic growth to education and the production of new technology, has dramatized the interest in the economic analysis of education, especially in the more developed countries.

On the other hand, Shamsul Hug (1975:86) stated, "The productive capacity of labor is predominantly a produced means of production representing human capital, created largely by investment in education". He pointed out that the rate-of-return on investment represents the alternative to manpower requirements approach in educational planning. Shamsul Hug (1975:88) wrote:

> The rate-of-return model is based on an analysis of the internal rate of return on investment in education through present value-cost comparisons derived from education-age-income data. The aim of this method is to estimate the economic benefits accruing from the costs of schooling, instead of estimating the manpower of various levels of schooling required for a given pattern of economic growth, which is the aim of manpower approach.

In a further elaboration of the role of the rate-of-return in educational evaluation, Shamsul Hug (1975:91) said that the rate-of-return model measures the demand for educated manpower by the differences in earnings among various categories of workers without reference to the available supply of labor. Others think that disregarding the supply side affects the results of rates-of-return. For example, Hollister (1970:16) stated, ". . . rates of return on educational investment are determined by the interaction of several supply and demand effects. Such effects are likely to operate differentially.over time on various age-education groups". Blinder and Weiss (1976:451) expressed a similar opinion when they said that the rate of investment in human capital and the supply of labor are related to some key variable, such as the stock of human capital. In this study, the demand and supply of labor was partially taken care of by adjusting earnings by an unemployment rate reflecting both age and education.

The rate-of-return as it applies to education, for that matter any economic activity, requires data on both the costs involved in acquiring the education and the benefits accrued over a lifetime of individuals. These costs and benefits are the topics of discussion in the following section.

Costs and Benefits of Education

The costs and benefits of education need to be quantified if researchers are to evaluate the profitability of education. Psacharopoulos (1973:IX) wrote, "The cornerstone of practically any analysis in the economics of education is the relationship between benefits and costs associated with different levels of schooling".

The contribution of education to the economic welfare of an individual and of society can be measured in two ways according to Schultz (1960) and Becker (1964). The two measures are direct benefits, that is the pecuniary value, and indirect benefits. Vaizey (1968:593) stated that the indirect benefits are analogous to 'external economies', which from the standpoint of society "provides its chief justification as a free unsubsidized public service". The benefits, both direct and indirect, have two components, that is, private and social benefits. Similarily, there are both private and social costs in education. The identification and valuation of private and social costs and benefits provide the basic data used to compute the returns to education.

Costs of Education

The cost categories and justification for their inclusion as private or social costs of education are discussed below.

Estimation of Private Costs. The private costs represent the costs of education incurred by individual students and/or their parents, and the foregone earnings (opportunity costs) of students while attending school. While the foregone earnings are classified as indirect costs, the rest of the costs met from out-of-pocket are referred to as direct costs.

Rogers and Ruchlin (1971:40) pointed out the problem of defining the price of education. They said that most people tend to think of the price of education as being tuition costs, and possibly, the cost of school supplies and transportation. However, these are just part of one component referred to as the direct cost of education. The disagreement comes when one considers the opportunity cost. For example, Vaizey (1968:594) doubted the usefulness of including the opportunity cost as a part of either the private or social costs. On the other hand, Schultz (1971), Blaug (1965) and others argued for the inclusion of opportunity cost to calculate the benefits accruing to individuals and to society. Opportunity cost is not the only area of contention. There are also other cost areas, such as human capital depreciation, obsolescence, and maintenance, which are not usually included in costs of education. These two areas of contention are further explored below.

(a) Opportunity costs - foregone earnings. The after tax income forfeited by individuals while attending school is found to be significant at the secondary and college levels. For example, studies made in Canada (Treasury Board Secretariat, 1976:11) indicate that one-half to two-thirds of the total allocative costs of university education consist of foregone earnings. Another example of the inclusion of foregone earnings is found in the work of Jallade (1977) in Brazil. He compared, among other things, private costs in terms of foregone earnings and public costs in lower secondary education. For the 1970 data, from all Brazilian non-farm males, the proportion of foregone earnings of the total cost was found to be 77 percent. Moreover, the work of Schultz (1971:94) which considered high school students in the United States in the year 1900 indicated that the share of foregone earnings was 73 percent of the total private costs. But the share was down to 60 percent in 1956. Based on the results of his study, Schultz (1971:88) concluded:

> From this experience, one may infer that poor countries, even when they are no less poor than were the people of the United States in 1900, will find that most of the real costs of secondary education are a consequence of the earnings that students forego while attending school.

Foregone earnings has been found to be different for different levels of education, region of employment, and social class in many countries. The study of Jallade (1977) and compiled studies by Psacharopoulos (1973) bear out this finding. Furthermore, changes of minimum wage laws and the level of employment affect the level of earnings foregone. The consideration of the employment rate, particularly in less developed countries can be even more important. Okigbo (1966:483), writing about the experience of Nigeria, stated that in a region of extreme underemployment it would be incorrect to add the income foregone by students to the cost of education. He added that for most pupils, the alternative to remaining in school is idleness. Schultz (1971:103) thought differently. He said that the value of children in production and household activities is high even at a tender age in poor countries.

Barsby (1972), on the other hand, stated that the employment and unemployment dilemma is unresolved as to its value in estimating the opportunity cost of education. He said that in calculating opportunity costs, the 'vacuum' effect, that is the number of jobs vacated by students, is not usually taken into account. Barsby (1972:15) added, "To the extent that the vacuum effect operates, opportunity costs for society are reduced. . . ." However, the opportunity cost for the individual is not reduced because the individual does not receive any direct benefit from vacating the labor market.

The other unresolved problem is, perhaps, the reverse of the vacuum effect. That is, what happens if all the students decide to seek employment instead of attending school? Unless the proportion of students is small compared to the labor force, the effect could be very significant, and may result in reduced wages and thus reduced opportunity costs. However, one could argue that the situation in which all students seek employment at the same time is unrealistic, and should not be a factor in the consideration of foregone earnings.

Bowman (1969) disagreed with the concept of the vacuum effect or its reverse. She observed that the critics who consider the question of throwing all the students on the labor market at once fail to point out the effect of throwing all teachers on the labor market at once. Bowman stated that the concept of vacuum effect has two methodological-conceptual fallacies: (1) overlooking the fact that foregone earnings are like all prices in measuring the value of a good or service, and (2) confusing which measures are proxies for which underlying variable or concept in a particular problem. Bowman (1969:645) went on to say, "In investigating resource allocation, which requires comparison of one alternative with another, 'foregone earnings of students' measures the alternative properly, ..."

The above arguments suggest that the estimation of foregone earnings may fail to reflect the real world. Ideally, according to Schultz (1971:108), we require the following information to calculate the foregone earnings:

1. the full earnings opportunity of the students. That is, if students were not in school, they would have been employed for which they would be paid; and,

2. the earnings the students realize while attending school. The foregone earnings are then found by subtracting 2 from 1.

In this study, the vacuum effect or its reverse is not considered. The suggestion given by Schultz is, however, applied. Alternatively, the foregone earnings are adjusted by the unemployment rate to test the effect on the returns to secondary education in the Bahamas.

(b) Depreciation, obsolescence, and maintenance costs. Human capital has characteristics similar to physical capital in depreciation, obsolescence and the cost of maintenance.

The depreciation of human capital is real. Klevmarken and Quigley (1976:49) said that the existence of retirement alone points to this conclusion, but the precise level of age-related depreciation probably varies with an individual's occupation. Klevmarken and Quigley (1976:56), Stoikov (1975:45), and others speculated that depreciation levels of human capital may also be affected by obsolescence of skills and knowledge and/or the deterioration of mental and physical capacity. Schultz (1970:38) added that advances in knowledge which become a source of new skills tend to make the skills of older workers obsolete.

The other source of the deterioration of human capital is non-use. Long period of unemployment could be one of the causes of deterioration of skills. Stoikov (1975:43) wrote, "the non-use of human capital for a lengthy period of time may lead to a serious deterioration of skills, knowledge, good working habits, etc." Schultz (1970:36) expressed a similar view when he said, "Educational capital deteriorates when it is kept idle. Thus unemployment impairs the skills and associated knowledge that a worker has acquired."

Miller (1967:283) agreed with the concept of human capital deterioration but argued that the human capital has more durability than the non-human reproduceable capital. Miller contended that depreciation and obsolence of human capital occurs at a much slower rate than physical capital. Miller (1967:283) added, "Usually only specialized training of the lowest sort becomes completely obsolete." But what about the cost of maintenance of human capital?

It is a common practice for people to invest in themselves at work places or through informal programs to maintain their skill and knowledge to be able to adapt to new demands. Klevmarken and Quigley (1976:48-49) observed that individuals invest first in length and type of schooling and, after entering the labor market, they make additional investments in training. Similarly, Shaffer (1968) argued that the maintenance cost of education need to be considered in human capital investment analysis because knowledge and training become obsolete over time if not maintained.

Conceptually, all the above categories of private costs need to be imputed to evaluate the rate-of-return of education. But in practice, the values of certain costs are difficult to determine. Therefore, in this study, no attempt is made to include all possible costs except those directly measureable costs that can be identified in one field survey and those obtainable from relevant documents. Unemployment data were needed to adjust foregone earnings. Other less tangible costs, such as depreciation, obsolence, and maintenance costs of human capital, which are expected to occur during the working lifetime of individuals, are not included in this study. The advice given by Klevmarken and Quigley was taken for this study, especially in as far as depreciation of human capital is concerned. Klevmarken and Quigley (1976:49) suggested that if one assumes that the depreciation rate is constant, knowledge of the retirement age and the rate-of-return is sufficient to estimate a gross investment profile consistent with any depreciation rate.

Estimation of Social Costs. The social costs of education are the total costs of education. They refer to all costs incurred by students and the society at large, except tuition and other fees which are considered as transfers to sociey instead of expenditures from the standpoint of society. Thus, the other private costs described above become part of the social cost. However, in calculating social costs, the foregone earnings are earnings before tax. In addition to the private costs, the social costs include the following:

1. Salaries of teachers and other non-instructional personnel.

2. Administrative costs.

3. Cost of depreciation and or implicit interest on school buildings. In this study, as has been the case in other studies such as the one done by Blaug (1971) in Thailand, the imputed rents are used for the calculation of the costs of capital outlay.

4. Costs of tax exemption. Schools are usually exempt from paying taxes. Such an exemption amounts to a hidden subsidy. But, this cost is very difficult to calculate and is not included in this study.

5. Subsidies to students.

6. Board and room.

As indicated earlier, the intangible costs are not included in this study. In a way of summarizing the previous discussion, the private and social costs of education are listed in Table 1.

Table 1

Categories of Social and Private Costs of Education

Types of Costs	Categories of Costs	
	Private	Social
A. Direct Costs	1. Tuition and other fees.	1. Salaries for teachers and non-instructional personnel.
	2. Books, supplies, and equipment (out-of-pocket expenditures).	2. Books, equipment, and supplies (total).
	3. Extra travel.	3. Travel (total).
	4. Board and room.	4. Board and room (total).
	5. Scholarship and other subsidies (to be subtracted from other costs).	5. Scholarship and other subsidies to students.
	6. Earnings of students during schooling (to be subtracted from other costs).	6. Administrative costs. 7. Imputed capital rent.
B. Indirect Cost	7. Earnings foregone.	8. Earnings foregone.

As indicated in Chapter II, the allocation of the social total costs of education under investment may not seem logical. Society's benefits from secondary education are expected to be a great deal more than the direct monetary return. Schultz (1968b:299) argued that only half of the total social cost in secondary education should be considered as investment. He said that from the societal point of view, the other half should be considered as expenditure to meet other social goals, such as political, social, and cultural. He did not see the same argument to be applicable to private costs because individuals are assumed to meet the costs of education mostly to maximize their income. However, most studies done so far assume that the total private and social costs of education are all investment. Similarly, this study assumed the total private and social costs to be investment in evaluating the profitability of secondary education in the Bahamas.

The private and social costs form a part of the information needed to evaluate the returns to educational investment. While the total or social cost of education was used to compute the profitability of education to society, the private cost was used to compute the individual return on education.

Benefits of Education

The monetary benefit of secondary education is the expected marginal productivity compared to the expenditure in acquiring different amounts of secondary education. In other words, the earnings of people with different amounts of education are used as a proxy for the productivity gains. The benefits of education are divided into private and social components.

The returns from education accruing to individuals and society are not expected to be the same because of the differences of costs incurred and taxes upon income. However, once the data on the earnings of workers are secured, the private and social monetary benefits of the secondary education are then calculated from the same data, provided the tax rates are known.

Education, of whatever form, has benefits other than the direct, monetary benefits expressed in terms of earnings. Theoretically, these extra benefits should be given some imputed monetary value. In this study, however, no attempt was made to impute the value but the benefits have been listed. Some of these extra benefits are discussed below.

(a) Extra benefits to the students. Weisbrod (1964), Cohn (1972), Davis (1970), Blaug (1970) and others indentified the following as additional benefits to students.

1. Financial option return. The decision to obtain

secondary education involves not only additional earnings but also the value of the opportunity to pursue college education. Weisbrod (1964:21) said that the value of the option to pursue additional education depends upon (a) the probability of its being exercised and (b) the expected value if exercised. Based on this concept, Weisbrod (1964:140-141) found that the option value of secondary education in the United States in 1939 increased the rate-of-return on secondary education cost from 14 to 17 percent.

The other financial option that education provides to individuals is the widened variety of job opportunities. That is, education may provide opportunities for the recipient to choose among jobs that provide higher pay and/or qualify the individual for advanced on-the-job training that may provide higher pay. It was assumed that the more education a person has, the more on-the-job training he is likely to obtain and the more likely to get more monetary returns. If this assumption holds, the value of this option is captured in the direct earnings streams.

2. Hedging option. Weisbrod (1964), Cohn (1972), Bowman (1970) and others said that education provides a person with the hedging option. That is, increased education helps the individual to adjust to changing job opportunities. Weisbrod (1964:23) pointed out, "Education may be viewed as a type of private (and social) hedge against technological displacement of skills." Those who have more education are

more likely to adjust to new technology, and are likely to reap the higher pay which the new technology has made possible. This line of reasoning suggests that general secondary education permits greater flexibility than a narrow specialization at the same level.

The return from the 'hedging' option benefit is likely to be reflected in the earnings of the individuals. In other words, part of the direct monetary return of the educated is due to the hedging option.

3. Non-market return. This return to the individual is reflected in the savings he makes by performing certain things for himself instead of having to pay others to perform them. For example, Weisbrod (1964:24-25) estimated that the market value of the personally filed income tax returns in the United States in 1956 was $250 million. This is an example of a saving which is attributed to education. Weisbrod said that if this service were provided through the market, it would be priced and included in national income. This particular return to individuals is not included in this study because of the difficulty of securing data.

While the above benefits of education directly affect individuals they are also social benefits. Education has other benefits external to the recipient of education. Some of these external benefits are briefly mentioned below.

(b) Benefits of education external to the student. Bowen (1964:22), Weisbrod (1964:28-34), Thias and Carnoy (1972:6), Davis (1970:65), and others said that people other than the student may benefit from education in two ways: (1) economically and (2) socially. These economic and social benefits can be separated according to the categories of persons who receive these external benefits.

1. Residence-related beneficiaries. These beneficiaries include the current family of the subject, future family of the subject, neighbors, and taxpayers. The benefits include informal education, inculcation of acceptable social values and behaviours which affect the feasibility of accomplishing social goals which, in turn, are expected to reduce social costs.

2. Employment-related beneficiaries. The beneficiaries are those who have employment relationships with the recipient of education. The education of one worker may have favorable external effects on the productivity of others because the people working with the recipient of education are likely to get some kind of non-formal education from him. In addition, employers are likely to capture further benefits, especially because market imperfections may result in a failure of the employer to pay the educated worker for his full (marginal revenue) productivity.

3. Society in general. The beneficiaries in this category are broader. Any residual benefit not classified in

the previous two categories was put under this category. For example, the contribution of education to the improvement of income distribution is an external benefit. Similarly, the elimination of bottlenecks to economic development through education or training usually has substantial externalities. In the context of less developed countries, Michel Debeauvais (1964:34) pointed out that:

> Secondary education is essential in the training of 'medium' personnel (elementary teachers, monitors, officials, middle classes). The shortage of such people is today a real obstacle to economic development.

The list of extra private and social benefits of education indicated above is not in anyway exhaustive, but it indicates that educational benefits go far beyond the direct monetary returns on educational investment. As a rule, all the benefits must be included to evaluate the total benefit of education. But, as Bowen (1964:22-23), and Thias and Carnoy (1972:6) have indicated, by their nature the indirect benefits are difficult to measure. Thus, this study was limited to the marginal direct lifetime earnings of workers who have had secondary education.

The direct, extra and external benefits of education identified above and others are summarized in Table 2. The summary reflects the observations of Davis (1970), Hirsh, Segelhorst and Marcus (1964), Weisbrod (1964), Barsby (1972), Bowen (1964), among others.

To the extent that the non-monetary benefits identified

Table 2

Categories of Social and Private Educational Benefits

Individual Benefits	Social Benefits
Categories of Benefits	
A. Direct Benefits	
1. Increase in earnings (net of taxes)	1. Increase in taxes (gross of taxes), that is maximization of total societal income (a) from secondary school participant (b) from others.
2. Additional fringe benefits due to increased income. (a) increased satisfation of students from the exposure to new ideas and cultural opportunities. (b) satisfaction gained by parents from the students' exposure to new ideas and culture.	
B. Indirect Benefits	
3. Informal education in students' future homes (intergeneration effects). 4. Increased consumption of goods and services due to extra income.	2. Increases in other income. (distribution effects) (a) due to increasing productivity of future generations as children become better educated (intergeneration effect). (b) due to previously unemployed workers taking jobs vacated by program participants (Vacuum effect)-indirect income effect. (c) by reducing tax burden and/or increase services for others from students incremental income (Tax effects). (d) due to incremental productivity and earnings of workers (indirect income effect). 3. Avalability to employer of well trained and skilled labor force. 4. Improved living conditions of neighbors.

above are not given any value and added to the direct monetary earnings, the rate-of-return is underestimated. On the other hand, many authors believe that earnings are influenced by factors other than education. Koulourianos (1967) and others have indicated that the estimates of educational returns on the basis of ceteris paribus will overestimate the returns. The issues involving factors other than education are discussed below.

FACTORS OTHER THAN EDUCATION THAT AFFECT EARNINGS-AGE-PROFILES

While there is a general agreement that education has a positive effect on income, the magnitude of the relationships between education and income have been found to be difficult to isolate because of other factors. Bowen (1964:16), Prest and Turvey (1965:726), Thias and Carnoy (1972:2-6), Koulourianos (1967:38), and others said that groups with differing amounts of education tend to differ in attributes such as natural ability, ambition, social class, family connections, inherited wealth, race, education of parents, on-the-job training, and hours of work, any of these are likely to increase eanings. Generally two methods are employed to take out the influences of these other factors.

The first was suggested by Denison (1962,1967) and later termed as the Alpha coefficient by Blaug (1965). Denison assumed that only 60 to 65 percent of the earnings differentials reflected secondary and higher education, the remainder, about 40 percent, was due to ability, family background and so on. On the other hand, Psacharopoulos (1975:54), after reviewing the studies made in OECD countries found the average value of alpha to be 77 percent. But in this study the original round figure of 60 percent was applied.

The second method, which Psacharopoulos (1973:29) claims is the better method, involves regression analysis to standardize earnings for factors other than education. This method uses various approaches two of which are given below.

(a) The first approach is to use longitudinal data of a sample of persons whose relevant characteristics are surveyed and whose earnings profile are recorded during their productive lives. These data can then be subjected to multivariate analysis to get estimates of earnings associated with education. However, it is difficult to apply this method because of the long time horizon needed to complete the study.

(b) The second approach, which is becoming increasingly popular for its practical application, is a multivariate analysis using a cross-sectional census or survey data on earnings, education and other factors. Psacharopoulos (1973) argued that this second approach is preferable to relate education and earnings. Psacharopoulos (1973:29) wrote:

> When data on earnings and other characteristics

> of individuals are known, it is possible to estimate a so-called "earnings function" by multiple regression, accounting for the variance of earnings in terms of education, age, social class, father's occupation, region and all other relevant variables.

Assuming that the factors other than education influence earnings, the differences of earnings among individuals cannot be entirely attributable to the differences of education obtained. In other words, failure to exclude those factors other than education is bound to lead to an overestimate of the rate-of-return on education.

There are other factors that are expected to distort the rate-of-return on education unless they are taken into account. These factors include: (a) conspicuous consumption and wage policies; (b) collective power: (c) unemployment; and (d) the non-marginality of cross-sectional data.

(1) Conspicuous consumption and wage policies. These are the forces that act against the normal market system in which workers are paid the value of their marginal product. Bowen (1964:18) stated:

> The phrase "conspicuous consumption" refers to the possibility that some employers may choose to hire college graduates (and pay them "college graduate" salaries) for jobs which do not really require college training.

Bowen (1964), and Thias and Carnoy (1972) maintained that conspicuous consumption does not seem to be widespread in the real world. On the other hand, they indicated that national policies may have wage structures and hiring policies that may not have any relation to productivity. To this effect, Bowen (1964:18) advised, "In countries where the salary structure is rigid because of status overtones, calculations of monetary returns to education can be misleading as a guide to educational policy." On the other hand, Rodriguez and Davis (1974:28) suggested, "Normally it is impossible for employers to pay workers a wage over a long period of time that exceeds the workers' productivity." They said that improved living standards of a nation are generally a result of increases in productivity, which to a varying degree is governed by the productivity of its labor force.

(2) Collective Power. Collective power by labor unions and other associations may influence the relative earnings. Bowen (1964:24) said that this market imperfection may have to be eliminated to arrive at a competitive condition. Rodriguez and Davis (1974:28) explained that the controversy regarding collective bargaining revolves around what share of productivity increases should be allocated to the various factors of production. They argued that any wage increases in excess of productivity lead to higher prices which may not be acceptable to governments and the society at large because of its inflationary characteristics. On the other hand, Thias and Carnoy (1972) observed that though collective power seems to be common, it is probably less permanent than the previous type of distortion.

Thias and Carnoy (1972:3-5) suggested that to correct for the above distortions, it is advisable to estimate 'shadow' wages which would prevail in purely competitive labor market, or simply define productivity in terms of income at the uncorrected rate. In this study, no provision is made for the market imperfections. Earnings are assumed to represent productivity.

(3) The effect of unemployment on earning. Perlman (1973:30), Thias and Carnoy (1972:4) and others said that significant unemployment may make wages or salaries invalid as a measure of benefits. They suggested that the rate-of-return on education should be adjusted by employment probabilities. In this study the foregone earnings and flow of lifetime earnings are adjusted by unemployment rates to test their effects on returns.

(4) The non-marginality of cross-sectional data. Prest and Turvey (1965), Thias and Carnoy (1972), Hansen (1968), and others stated that cost-benefit analysis reflects the situation that exists at the time the data are collected. They said that these cross-sectional data do not accurately reflect both wages and costs in that some are likely to change over time. They suggested that the cross-sectional data have to be extrapolated into the future by using supply and demand as a function of earnings and Gross Domestic Product to overcome the shortcoming of a single time data.

Similarly, Jallade (1977:25-26), and Hollister

(1970:64-65) argued that the adjustments by economic growth rate on cross-sectional data on earnings is important to reflect the future incomes. In a growing economy many of these are likely to rise and actual lifetime incomes will be higher than those calculated from cross-section data.

Thus, differential earnings due to secondary education in this study were multiplied by a factor reflecting the rate of economic growth of the Bahamas.

Factors that are assumed to be responsible for inaccuracies in the returns to education have been identified. While some factors are likely to increase the rate-of-return, others have the tendency to decrease the rate-of-return. The effects of these positive and negative factors on earnings may possibly compensate for each other, so that the rate-of-return based on the measureable monetary returns and other relevant data may reflect the real return on education investment. Psacharopoulos (1973:39), reviewing the study made by Hines et al. (1970) observed:

> ... one of the things this study demonstrates is that, after all adjustments are made, it is possible that the final rate of return figure will be very similar to the unadjusted one, since many of the adjustments act in opposite directions and therefore cancel out.

The observation of Psacharopoulos can be tested for its consistency by referring to some empirical studies, which follow.

SURVEYS OF FINDINGS

The studies of investment on education, reviewed below, were selected for their relevance to the present study and to the questions raised above.

1. Hansen (1968), using the 1950 United States Census of Population, computed the male private and social rates-of-return to years of schooling. He used both direct and opportunity costs along with education-age-income profiles. The incomes were adjusted for mortality. The private returns were computed for gross-incomes, and incomes adjusted by Federal tax rates. A few of the results are quoted here.

The social average internal rate-of-return for 10 and 12 years of education over 7 years, (that is 3 and 5 years of education, respectively, affect grade 7), and for 12 years of education over 9 years were found to be 16.3; 15.3; and 11.4, percent, respectively. Hansen also calculated the marginal social internal rates-of-return. For example, the returns to grade 8 over grade 7; grade 10 over grade 9; and grade 12 over grade 11 were reported to be 29.2; 9.5; and 13.7 percent, respectively.

The returns on the private resource investments in schooling before and after tax were found to be high compared to the social returns, as the figures below show. The private internal rate-of-return up to and including grade 8 was found to be infinite because of the assumption that education is costless to the individual at the primary level. On the other hand, the average private internal rates-of-return before tax for 10 and 12 years of education over 7, and 12 years over 9 years of education were reported to be 25.9; 23.3; and 15.3 percent, respectively. The tax adjusted private rates for the same levels were found to be 24.8; 22.2; and 14.5 percent, respectively. Moreover, the marginal private internal rates-of-return before tax of grade 10 over grade 9, and grade 12 over grade 11 were reported to be 12.7, and 18.6 percent, respectively. The after tax private rates for the same levels were found to be 12.3, and 17.5 percent, respectively.

The above returns indicate that the adjustment for taxes makes little difference to the internal rate-of-return.

2. Hanoch (1967) used a sample of 1/1000 of the 1960 United States Census of population to study the male private rates-of-return in education. His sample consisted of 57,000 males 14 years and over who reported such things as their earnings, schooling, age, race, region, mobility, type of residence, marital status, size of family, and number of children. All together 23 explanatory variables on earnings were identified.

Hanoch included only foregone earnings as cost of education. He assumed that the direct private cost is equal to the earnings of students while attending school, and therefore cancel each other. On the benefit side, Hanoch estimated age-earnings profiles by years of schooling using regression analysis. Based on the income data, Hanoch calculated the private marginal and average internal rates-of-return by region and race for different school levels, such as primary over zero to 4 years of education, 4 years secondary over 8 years primary, and the like. He found, among others, that four years of secondary over primary for whites in the North yielded 16.1 percent. For those in the South, the yield was 18.6% percent. For non-whites living in the North, the return for secondary education was found to be 23 percent, whereas for those living in the south the return was found to be only 11 percent.

The marginal rates, that is the internal rates-of-return of adjacent grades, showed a downward trend as the amount of schooling increased. That is, the higher the amount of schooling, the lower the marginal internal rate-of-return. Hanoch (1967:326) observed, "This seems to verify the conjecture that the marginal efficiency of investment in schooling is decreasing."

3. Hines _et al_. (1970) used a similar data base to investigate private and social rates-of-return to investment in schooling. Using a 1/1000 sample of the 1960 Census they identified 107,000 persons, male and female, of 14 years and over.

Hines _et al_. assumed the private costs to be only the earnings foregone. Direct costs by students were assumed to cancel out by the earnings of students during the school year and vacation periods. Their computation of the internal rates-of-return was done by race, sex, and region. Further sensitivity analysis was made for white males by adjusting earnings by economic growth of 2 percent in earnings, mortality, ability, taxes, and interest on property.

The unadjusted private internal rate-of-return for the whole United States, for white male and non-white male, of 12 years of education over 8 years was found to be 19.5 percent and 27.3 percent, respectively. The private returns of 12 years of education over 5-7 years was found to be 24.4 percent for whites and 17.7 percent for non-whites. The adjusted private internal rate-of-return of 12 years of education over 8 years primary for white males was found to be 15.8 percent, a reduction of 19 percent compared to the unadjusted rate.

Hines et al. also analyzed the social internal rate-of-return. They found the unadjusted social return for 12 years of education over 8 years primary to be 14 percent for whites and 16.7 for non-whites males, whereas the social return of 12 years of education over 5-7 years of schooling were found to be 15.5 percent for white and 11.9 percent for non-white males. The adjusted social return of 12 years of education over 8 for whites was found to be 9.9 percent, a reduction of 29 percent from the unadjusted figure. The adjustments had very little influence on primary and higher education. But the secondary level was affected substantially. Hines et al. (1970:338) stated that the downward adjustment for ability[1] more than offsets the upward adjustment for economic growth in income at the secondary level.

The results found by Hines et al. (1970) and Hanoch (1967) are similar. In both studies, there is a similar downward tendency of marginal returns, as the education level increases. Some of the adjustments do not change the unadjusted interal rates-of-return very much because they act in opposite directions thereby cancelling each other.

3. Hirsh, et al. (1964) collected data using a sample survey in St. Louis City-County, United States, in 1957 and tested the contribution of the following variables on income: race; sex; years of schooling; educational quality in terms of expenditure; occupation; self-employment and supervisory status; informal education as reflected by occupation of father; experience in terms of age; migration from deep south; and, size of birth place (that is, population size of community where the individual was born). Adjusting earnings for the probability of death and using regression analysis, Hirsh, et al. (1964) found that only 40

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[1] Ability measures include religion, personality, father's education, labor market conditions, mobility, and supervisory responsibilities (Hines et al., 1970:333).

percent of the 1956 income of the household residing in the surveyed area were explained by the above variables. Hirsh, _et_. _al_. (1964:301-302), however, concluded.

> Number of years of schooling and sex were the most important factors affecting income. (Schooling was the single most important when sex was included).... Closely following in importance was, ...,in decreasing order, occupation, self-employment and supervisory status, and race.... It was also found that each additional year of secondary education had at least twice the positive effect on income as did primary education.

4. Wolff (1977) studied the United States labor force using 1/1000 of 1960 and 1970 _Census Public Use Sample_ stratified by occupation with a sample size of 41,349 and 63,661, respectively. The purpose of the study was to find the relationship between schooling and earnings across and within occupations.

Regressing mean earnings on mean schooling across occupations, Wolff found R^2 to be 0.345 and 0.404 for 1960 and 1970, respectively. He observed that even though the mean schooling between occupations fell somewhat over the period 1960 to 1970, a strong correlation was evident between mean earnings and mean schooling across occupations. Wolff stated that the best paid professionals were also the most highly educated. The relationship of earnings to schooling seems to be negligible when schooling and earnings were considered within occupation. Wolff found a variation of five and half years of schooling in both 1960 and 1970 within occupations. He said that the difference attributable to schooling within occupations is substantial enough to warrant a further analysis of the relationship of schooling to earnings.

Wolff (1977:264) stipulated that the rate-of-return approach for earning variations within occupations may not be appropriate because the measure may understate the effect of schooling on earnings within certain ranges of schooling and overstate it in other ranges. He reasoned as follows:

> In some occupations there may be a "threshold" level of schooling where earnings jump but at other levels of schooling there may be no incremental effect on earnings. In other occupations earnings may rise with schooling up to a certain point and level off. In still others the schooling profile may be flat up to a certain point and then rise with schooling.

Wolff claimed that the appropriate statistical technique would be interval analysis which would allow researchers to determine the sensitivity of earnings to schooling within occupations. He suggested that even though the interval analysis is similar to regression analysis in measuring the sensitivity of one variable to another, it is also different in that the form of the relationship does not have to be pre-specified. After having analyzed the data, Wolff (1977:274) concluded that for an occupation that required school-related skills, education will be productivity augmenting.

5. Wilkinson (1966) made a study in the Canadian setting of the relationship of earnings to education within

occupations. His data base was the 1961 Canadian census of population from which he selected a sample of the male population who had jobs or looked for work during the week prior to the 1961 Canadian Census. The main purpose of the study, according to Wilkinson, was to examine discounted present values of earnings for specific occupations for different amounts of education.

Wilkinson reduced income and cost by mortality rate for the social return, and income tax for the private return. He tested the returns by using three discount rates (5, 8 and 10 percent) to reflect three possible rates of time preference. He found that at a 5 percent discount rate, additional education increased present values in every case. At 8 and 10 percent discount rates, the dollar variations in present values among different levels of education decreased. Wilkinson (1966:562) explained, "Not only absolute dollar inequalities but also relative inequalities in discounted returns diminish as the interest rate rises."

The private net present values calculated for six occupations and different amounts of education showed that at 8 and 10 percent discount rates, the returns for some higher school levels is lower than the return for the lower level of education. For example, at an 8 percent discount rate, the present value of 4 years of high school for carpenters occupation was found to be $25,100 whereas the return for two years of high school was estimated to be

$26,400. On the other hand there was no consistency among the returns on four years of high school in the six occupations. Wilkinson speculated that the returns to increased amounts of education within an occupation will not always result in increased discounted earnings. For example, four years high school is not a worthwhile investment for either laborers or carpenters if their discount rates are either 8 or 10 percent. On the other hand, Wilkinson suggested that the greater inequalities in returns among occupations could be due to variation in ability; on-and off-the job training; knowledge regarding opportunities in the jobs with larger returns; unemployment rates for persons of different skill levels; and perhaps in bargaining power or traditional-based wage scales.

6. Blaug (1971) conducted a special survey in Bangkok-Thonburi area in Thailand to estimate the rates-of-return on investment in education. The survey covered about 5,000 males and females. Blaug identified 69 independent variables which were used to standardize earnings. These variables included age, sex, years of schooling, parents' education, father's occupation, ethnic origins, sector of employment, foreign vs. local degree, and so on. The degree of standardization produced, according to Blaug, an alpha coefficient of .55, but the results showed that the alpha coefficient vary both by level of education and age.

Blaug, using a step-wise regression, found that education alone explained about 30 percent of the variance of earnings. That is, each additional year of education produced about 5 percent increase in earnings. Adding age to the regression equation reduced the effect of education slightly, but the two variables accounted for 44 percent of the total variance in earnings. Blaug found, among other things, that sex, age, education, and employment in a large firm accounted for 47 percent of the total variance in earnings. Blaug observed that education alone contributed more to the explanation of age specific earnings than any other variable.

Blaug also calculated social rates-of-return. He reported the social rate-of-return of 11 and 10 percent for 10 years of education over 7 years, and 12 years of education over 10 years, respectively.

7. Carnoy (1967) collected cross-sectional sample data of 4,000 male urban wage earners in Mexico in 1963. The variables included wages and salaries, years of schooling, age, father's occupation, type of industry in which the employees worked, location, and occupation. Carnoy used the data to estimate income as a function of the independent variables. When education only was used as an explanatory variable, it was found to explain 43 percent of the variance in income. The addition of age as an independent variable reduced the percentage of variance associated with schooling to 36 percent. Moreover, the further addition of location,

father's occupation, industry, and school attendance, reduced the variance in income associated with schooling to 29 percent. Carnoy (1967:360) explained that of all the variables used, education is the largest single determinant of income variance.

Carnoy also calculated the private and social rates-of-return for adjusted and unadjusted age-education income profiles. On the cost side, he used both direct and indirect costs. The internal rates-of-return, adjusted for father's occupation, do not seem to be significantly different from the rates-of-return of the unadjusted income stream. These data are shown in Table 3. Carnoy (1967:366-367) indicated that the mean level of schooling of wage earners in the sample varied according to the occupation of their fathers.

Carnoy compared the results of his study in Mexico with studies made in other Latin American countries. To do that he had to find the average rates-of-return for the primary, secondary and university level for Mexico. The average social returns were reported to be 25 percent for primary, 17 percent for secondary, and 23 percent for university. Comparable returns for secondary education in Chile, Columbia, and Venezuela were found to be 22, 25 and 17 percent, respectively. All these rates are for the unadjusted income streams. Because of different assumptions used in each of the studies and the differences in the grades considered, the comparisons were inconclusive.

Table 3

Private and Social Internal Rates-of-Return by Year of Schooling, Urban Males; Mexico: 1963

Years of Schooling		Rates of Adjusted and Unadjusted Income Profiles		
		A	B	C
7- 8	social	23.4	20.6	17.1
	private	36.5	31.0	24.0
9-11	social	14.2	12.3	13.2
	private	17.4	15.2	16.8
12-13	social	12.4	11.4	16.7
	private	15.8	14.6	22.4

Source: Carnoy (1967:366), Table 6.

A-represents the internal rate-of-return computed from unadjusted income.

B-represents the internal rate-of-return computed from income holding father's occupation constant.

C-represents the internal rate-of-return computed from income holding father's occupation, industry, city of occupation, and attendance constant.

8. Thias and Carnoy (1972) conducted a survey of 4,742 Kenyan employees in three Kenyan cities in January and February 1968. The purpose of the study was to find the rates-of-return on educational investment. The raw earnings were adjusted for (a) socio-economic variables (age, tribe, parent's literacy, and father's occupation); (b) job related variables (size and nature of firm where employees work, job level, on-the-job training); and (c) educational variables (primary, secondary, post secondary, and examination scores as a proxy for ability). Other adjustments on earnings included taxes, mortality, and the employment probability. On the cost side, they used both direct and indirect costs.

Some of the results of both adjusted and unadjusted rates-of-return are reproduced in Table 4.

As shown in Table 4 the tax adjustment does not seem to have much effect on rate-of-return except for the grade 10-11 educational level. In this case it reduced the private rate from 52.2 to 40.2 percent or by 1/5th. As for the mortality adjustment on the social return, the effect is negligible for grade 10 and above. The socio-economic adjustment reduces the rates-of-return appreciably in the lower grades, but its effect seems to be negligible in the upper grades.

Adjusting for ability in addition to socio-economic variables at the primary grades reduced the social rate-of-return from 21.7 to 13.0 percent, which implied, according

Table 4

Social and Private Rates-of-Return to Schooling for Male by Years of Schooling, Adjusted: for Age Only; for Age, Taxes and Mortality Only; and for Age and Socio-Economic Variables Only; Kenya: 1968.

Years of Schooling	Adjusted for Age Only		Adjusted for Age, Taxes and Mortality*		Adjusted for Age and Socio-Economic Variables		Adjusted for Age, Taxes, Mortality, Soc. Econ. and exam score	
			Tax Adj.	Mortality Adj.				
	Private	Social	Private	Social	Private	Social	Private	Social
8- 9	23.6	16.3	23.6	14.8	20.6	13.7	9	6
10-11	52.2	33.5	40.2	33.5	36.1	25.8	30	26
8-11	36.1	23.6	31.6	24.0	32.0	21.0	19	18
12-13	23.8	14.7	22.9	14.7	23.8	14.7	23	15

Source: Thias and Carnoy (1972), Table 4.4, p. 72; Table 4.13, p. 91, and Table 4.14, p. 92.

*Taxes apply for private, whereas mortality applies only for social return.

to Thias and Carnoy (1972:79-80), that schooling itself is responsible for only 60 percent of the return to investment in primary schooling. On the other hand, the adjustment by ability at the upper secondary level and university level showed that 80 percent of the variance in earnings is explained by schooling. In other words, the alpha coefficient increased from lower to higher education, the variation being 60 to 80 percent. Thias and Carnoy suggested that all the adjustments indicate that 60 percent of earnings is attributable to education when secondary education is considered. However, this figure increases to 80 percent when university level education is considered.

9. Blaug _et_ _al_. (1969), in their study of educational returns in India, adjusted cost for wastage and income by the probability of unemployment as well as a 2 percent economic growth rate. They then compared the result with unadjusted figures. They found the private return for an engineering degree over illiteracy to be between 15.2 percent and 21.2 percent. The social return for the same category was reported to be between 12.3 percent and 17.3 percent. The lower limits are based upon the adjusted figure using 0.5 alpha coefficient while the upper limits are based upon the unadjusted figure.

General Observations of Findings

The studies quoted above include the adjusted and the unadjusted returns in both private and social returns in both developed and developing countries. The comparison of the results is difficult because of the different assumptions used by the researchers. Hansen (1970), and Psacharopoulos (1973), among others, have attempted to identify the patterns of rate-of-return in different countries. Both attempted to trace the data used by different researchers; the profitability type (that is social, private); methods used in construction of benefits; sex considered; and adjustments used (alpha coefficient, wastage, mortality, unemployment, etc.). Psacharopoulos attempted to standaridize the results for comparative purposes. His attempt was worthwhile and may be used to compare the results of this study and others.

The rates-of-return results in most studies indicate that primary education yields more than any other level followed by secondary and college education. The high profitability of elementary education for individuals is due to the very small or negligible cost incurred by individual pupils. The other observation that could be made from the international comparison is that the return on education in less developed countries is generally higher than it is in more advanced countries.

CONCEPTUAL FRAMEWORK

The foregoing review of rate-of-return analysis and its components, the overview of the relationships of earnings, education, age and other factors, and the review of empirical results in various countries all seem to indicate that the rates-of-return could be overestimated or underestimated, depending on the variables used to adjust earnings streams.

Factors such as socio-economic status, ability, region, sex, occupation, firm size and location and a number of other variables are assumed to contribute to earnings. Exclusion of these variables and assuming that only education explains earning differentials may lead to overestimation of rate-of-return. It has been demonstrated empirically that factors such as socio-economic status and ability have strong correlations with education. The effects of these variables are speculated to be working directly and indirectly through education. On the other hand, the proxies employed to test the effects of ability on earnings were found to be controversial. Some researchers use I.Q.'s, some standardized examination results, and some others use students relative standing in a given school level and the like. Griliches (1970), Griliches and Mason (1972), Holmes (1974), Hause (1972) and others maintained that the effect of ability on earning differentials is exaggerated. They said that causation runs both ways between ability and education so that only the ability measure taken prior to schooling may add to the explanation of income variance. Some others believe that the inclusion of socio-economic background and ability together to adjust earnings may not yield separate effects because these two variables are also strongly correlated. Others, such as Psacharopoulos (1973) think that the stage of influence of ability and socio-economic background are different. Psacharopoulos (1973:40-41) observed:

> Whereas ability screens the flow of students to the higher educational levels,the socio-economic background screens the flow of students from the earliest educational levels. What empirical evidence shows, is that the socio-economic background at the early stages is much more important than the ability factor later on.

The same can be said of the relationship between occupation and education because they are closely related. For example, Holmes (1974), in his economic analysis of Canadian workers of 1967, found that education and occupation seem to be going in the same direction. Holmes (1974: 18) observed that there was "no one in the professional and technical field with no education, and no one with a university degree working as a logger, a miner, or a fisherman." Similarly, Blaug (1976:837) and others, said that in human capital theory individuals with a given amount of education choose occupation that equalize the present value of their lifetime earnings. Taubman (1976b: 195), on the other hand, stated that the total effect of education on earnings may be understated if the occupation the person holds is not included as a variable that affects earnings or nonpecuniary returns. Furthermore, Mincer (1976: 147) suggested that the appropriate analysis of lifetime earnings must take into account the occupational experience profiles as well as the schooling component of occupation skills. Mincer (1976:158) explained, "In large part, then, occupation can be viewed as a composite of skills acquired both in schooling and on the job."

The correlation of such factors as socio-economic status, ability, occupation, and education, among themselves mean that they may have direct and indirect influence on earning differentials. But the degree of their influence is not yet clear. If their influence on earnings is indirect through education, their addition to the equation for estimating earnings is bound to lead to underestimation of the effect of education on earnings variation. But some evidence indicates that factors other than education influence earnings directly so that their exclusion leads to overestimating the rates-of-return on education.

The influences of factors, including education, on earnings and their relationship to each other, as they are described above, are depicted in Figure 1.

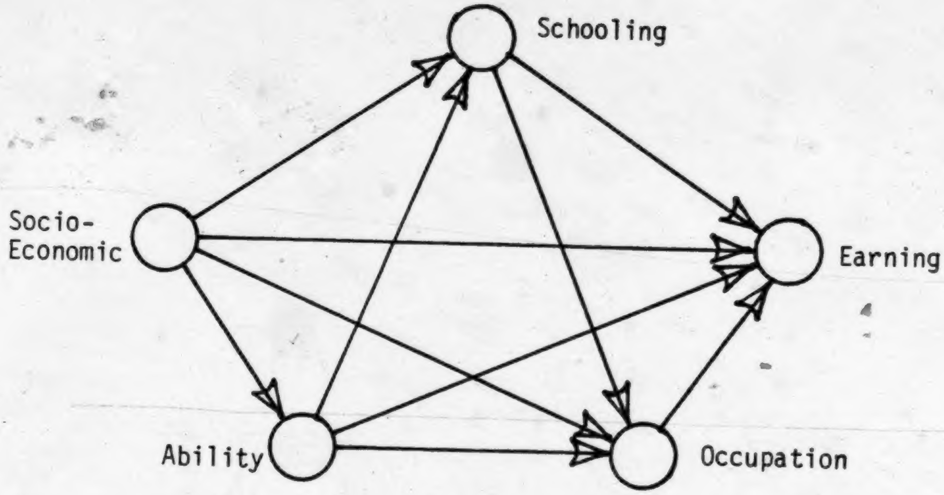

Figure 1: Relationships of Independent Variables that Determine Earning Differentials

Source: Psacharopoulos (1977:324).

The relationship shown in Figure 1 is discussed in more detail by Psacharopoulos (1977) in his study of the contribution of each independent variable to earnings. The relationship of the independent variables, as shown in Figure 1, are complex and their influences on earnings are indirect as well as direct. In this study the direct and indirect influences of factors other than education on earnings are taken care of by adjusting earnings by alpha coefficient of 60 percent. This downward adjustment of earnings by an alpha coefficient, however, does not necessarily capture all the benefits of education, direct and indirect, and ignores the accounting of total direct cost of education considered as investment.

On benefit side, the rate-of-return is computed only on the income streams associated with different amounts of education. But the monetary return ignores the intangible benefits of education that accrue to individuals who acquired the education, other individuals and the society at large. To the extent that these intangible benefits are not given any monetary value and added to the earnings streams, the return to education is underestimated. In this study the non-monetary returns were not included, thereby underestimating the total returns to education.

The treatment of the cost of education could be responsible for distorting the estimates of rates-of-return. While some researchers use out-of-pocket expenses of students and foregone earnings as private investment on education, others assume that only the foregone earnings should be used because the direct costs of students are likely to be met by earnings obtained from part-time and summer jobs. Furthermore, the costs of pre-schooling and post-schooling are not usually included with the costs of formal education. In other words, the exclusion of these costs may lead to the overestimation of rates-of-return. On the other hand, the use of the total direct and indirect costs of formal education implies that education has no value other than economic return. In this case, the investment cost is overestimated. But assuming that educational expenditures are incurred for economic as well as other social objectives, the expenditures need to be adjusted downward to reflect only the investment aspect of the costs involved. Without this adjustment, the rate-of-return on education is underestimated. In this study, all costs were considered as investment thereby underestimating the return to education.

The contribution of most of the important independent variables has been identified and discussed above. Since one of the purposes of this study was to compare the results with other studies, the rate-of-return analysis, which includes net present values and internal rates-of-return, dealt with both the adjusted and unadjusted returns. The adjustments, as they apply in this study, are shown in Table 5.

Table 5

Costs, Earnings, and Adjustments Employed to Compute Private and Social Returns to Secondary Education in the Bahamas

Adjustments Employed for Costs and Benefits	Adjustments made to Social	Private
Costs Adjustments		
-Direct - unadjusted	x	x
-Foregone earnings-adjusted by		
Economic growth of 2%	x	x
Unemployment rate	x	x
-Alpha Coefficient of 60%	x	x
Earnings Adjustments		
-Alpha Coefficient of 60%	x	x
-Economic growth of 2 %	x	x
-Unemployment Rate	x	x

The adjustments shown in Table 5 were introduced separately and in various combinations to test their individual and combined influences on returns. The combinations of the adjustments employed in this study were: (1) unemployment and economic growth; (2) unemployment and alpha coefficient; (3) economic growth and alpha coefficient; and (4) unemployment, economic growth rate, and alpha coefficient.

SUMMARY

In this chapter the direct and indirect costs and benefits of education were identified and discussed. Moreover, the influences of factors other than education on earnings were examined.

The inclusion or exclusion of factors other than education in the rate-of-return analysis was found either to underestimate or overestimate the returns to education. It was also shown that the monetary return to education captures only part of the benefits of education.

Some empirical studies were reviewed with a view toward establishing the influence of education and other factors on earnings differentials. Finally, the conceptual framework was developed to serve as a guide for the analysis of investment on secondary education. The conceptual framework developed in this chapter is the basis for the research design and data analysis in the following chapters.

CHAPTER IV

RESEARCH DESIGN

This Chapter deals with the subjects under study, the data base and sources, the mathematical models employed to compute returns, and the rationale for the discount rates necessary to use the mathematical models.

THE SUBJECTS

The study is concerned with the economics of the decisons made by the male labor force of the Bahames, age 15 to 60 inclusive, who invested their time and money to pursue further secondary education after they have finished grade six of the primary level. The subjects under consideration, therefore, included those members of the male labor force who had 7-13 years of education, inclusive, as against those who joined the labor force after completing 6 years of education. Moreover, the decision to continue from one grade level to another in the secondary level instead of joining the labor force was analyzed in terms of both marginal and average rates-of-return.

INCOME DATA BASE

The source of data on income was the Bahamas Census of Population of 1970 which provided information on age, education, and income of the male and female population of the Bahamas.

COST DATA BASE

The costs, especially the direct cost of secondary education representing 1970-71 academic year were gathered by questionnaire/interview technique from selected secondary schools in New Providence during January-February 1978. The direct costs included all costs incurred by individual students and educational institutions. While the costs met by a student to attend a given education level were considered as private costs, the costs met by individuals and educational institutions were classified as total or social costs of education.

In addition, the private and social indirect costs, which are the foregone earnings of those who chose to continue their education instead of going to work, were taken directly from the annual earnings streams.

The appropriate cost for this study is the cost per student per year at the secondary level. The private and social costs were determined from the various expenditure items as shown in Table 6 below.

In countries where there is a direct personal income tax, the private foregone earnings would have been adjusted for taxes. In the Bahamas there is no direct personal income tax; hence, the magnitude of income foregone is the same for both private and social measurements.

Table 6

Itemized Costs of Education

Private Costs	Social Costs
Direct Costs	
-Tuition and other fees	-salaries of teachers and other personnel
-Expenditure on supplies and equipment	-private and institutional expenditure on supplies and equipment
-Expenditure on books	-private and institutional expenditure on books.
-Scholarship and other subsidies obtained by students (to be subtracted from other costs)	-scholarship and other subsidaries to students
-Income from partime and vacation employment (to be subtracted from other costs)	-administrative costs
-Extra travel associated with schooling	-imputed rent on buildings and equipment
-Extra board and room associated with schooling	-private and institutional expenditures on travel
	-Private and institutional expenditures on board and room
Indirect Costs	
-Foregone Earnings	-Foregone earnings

OTHER DATA REQUIRED

The other information required for this study on secondary education included (a) the past and projected economic growth rate of the Bahamas, and (b) unemployment rates by age and education. While the unemployment data were required to adjust incomes to test the influence of unemployment on returns, the economic growth rate was required to add a predictive value to the results in addition to the descriptive aspect of cross-sectional data.

METHODS OF DATA COLLECTION

As indicated earlier, the income data were collected from published documents of the 1970 Bahamas Census of Population and other related materials. The data for the private and social direct costs were collected by using a prepared questionnaire for interviewing school personnel. Because of the survey costs involved, a limited number of secondary schools were sampled. In addition to the field survey, other pertinent documents were consulted to determine the private and social costs per student for each secondary grade level. The mechanics of data collection are shown in the following matrix in Table 7.

The sources of other information, such as economic growth and unemployment rates, were obtained from documents published by the Statistics Office and other government agencies in the Bahamas.

Table 7

Data Collection Techniques and Sources of Direct Costs of Secondary Education in the Bahamas

Information Required	Data Collection Techniques Document Search	 Questionnaire/ Interview	Sources of Information
1. Tuition and other fees		x	Selected Schools
2. Supplies and equipment		x	Selected Schools
3. Books		x	Selected Schools
4. Extra travel		x	Selected Schools
5. Extra board and room		x	Selected Schools
6. Scholarship and other Subsidies	x	x	Selected Schools and Ministry
7. Income from parttime and vacation employment	x	x	Ministry of Labor & Selected schools
8. Salaries of teachers and other Personnel	x	x	Min. & Selected Sch
9. Administrative costs	x	x	Min. & Selected Sch
10. Capital Costs	x	x	Min. & Selected Sch

Note: Min. refers to the Ministry of Education and Culture.

RELATIONSHIP BETWEEN COSTS AND BENEFITS

The methods and procedures employed to compile and to disaggregate data by age-education-income are discussed in Chapter V. Here some examples are given to show the relationship of costs and returns, represented by monetary income, to compute the marginal earnings due to extra education.

A sample of earnings profiles of workers with elementary and secondary education can be presented graphically as shown below in Figure 2.

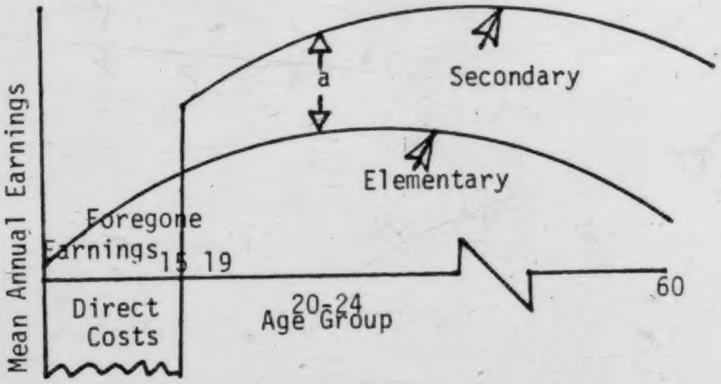

Figure 2: Age-Education-Earning Profiles (Samples)

The difference between the two earnings streams, that is between those who have elementary education and those who have secondary education, is the vertical distance between the two lines shown in Figure 2. For example, the difference in earnings between elementary and secondary at age 20-24 is the distance 'a' shown in Figure 2. Furthermore, Figure 2 shows the lifetime opportunity cost of those who decided to continue their secondary education instead of going to work at the end of elementary education. In other words, the earnings of those who had elementary education represent the foregone earnings during the periods of secondary schooling, and opportunity cost thereafter. Therefore, the investment on secondary education is compared to the benefits represented by the extra stream of earnings associated with the extra education. The same procedure was applied for other marginal education levels, such as comparing earnings and cost of one grade level over another.

In this study, the analysis of returns to secondary education took into account both the direct and indirect costs and mean earnings differential of a given secondary education against the primary level and/or against the lower grade(s) at the secondary level. Primary or elementary refers to the completion of grade 6; grades 7 to 13 inclusive refer to the secondary level. According to educational documents students transfer from one grade level to another automatically. Hence, it was assumed in this study that repetition at any grade level is negligible. On the other hand, the Bahamas has a compulsory education law which requires that children from ages 5 to 14 attend school. Assuming automatic transfers from one grade to another at the end of each academic year, age 14 corresponds to the completion of grade 9. The relationship of age and grade level are produced in Table 8.

Table 8

Relationship of Age and Grade, Bahamas: 1970

	Primary		Secondary					
Age	11	12	13	14	15	16	17	18
Grade	6	7	8	9	10	11	12	13

Source: Annual Report 1970-71:61

The relationship of ages and grades indicate that the foregone earnings up to and including grade nine do not exist during schooling, because the legal age for employment is age 14 in the Bahamas. However, the opportunity cost, for example, of grade 7 over grade 6 will be the lifetime earnings of those who have six years of education.

Age 14, because of the compulsory education law and legal age to work, would have been a natural focal point for this study. But the number in the labor force of 14 years of age was too small to be reliable. Thus, costs and monetary returns were discounted to age 15 for every amount of secondary education to compute returns. Any cost made for education before the age of 15 was assumed as being invested just one year earlier, because there is no way to determine the exact date of investment. The same reasoning has been applied to those who completed grade 8 and dropped out from the school system. This assumption is bound to understate the direct costs associated with grades 7 and 8. Under normal cost accounting, the costs would have been brought to age 15 by using certain interest rates. Furthermore, any income acquired before the age of 15 is assumed to be zero even though it is possible that those individuals who dropped out of school before they reached age 15 may have been employed in some capacity.

Table 9 is constructed as an example to show the calculation of direct and lifetime opportunity costs and earnings of one level of education over another. For this illustration grade 10 over 6 is taken. The costs and earnings of grade 10 over 6 imply that a person who has 10 years of education has invested his money and time to continue his education in grades 7, 8, 9 and 10 at the corresponding ages of 12, 13, 14, and 15, respectively. There is no foregone earning during schooling in grades 7, 8, and 9 or for ages 12, 13, and 14.

Note that the people who decided to continue their education up to and including 10th grade had to meet direct costs represented by C's in Column 2, and forego the earnings represented by CE's during schooling up to the age 15. Moreover, the earnings of grade 6 after age 15 are considered as opportunity cost for those who have 10 years of education because they have to forego that income stream to complete grade 10 and consequently assume a new earnings stream represented by E's. Therefore, the extra earnings associated with the investment decision to pursue education

Table 9

Mean Differential Earnings of Grade 10 over 6 by Age (Sample)

Age (1)	Direct Cost (C) (2)	Opportunity Cost Mean Earn. of grade 6 (CE) (3)	Total Cost (Col.2+3) (4)	Mean Earnings of grade 10 (E) (5)	Marginal Earnings (Col.5-4) (6)
14	C1*	-	C1	-	-C1
15	C2	CE1	C2+CE1	-	-(C2+CE1)
16	-	CE2	CE2	E1	(E1-CE2)
17	-	CE3	CE3	E2	(E2-CE3)
18	-	CE4	CE4	E3	(E3-CE4)
19	-	CE5	CE5	E4	(E4-CE5)
20	-	CE6	CE6	E5	(E5-CE6)

*C1 includes the direct costs incurred in grades 7 and 8.

after grade 6 up to and including grade 10 are all the lifetime earnings of grade 6 plus the out-of-pocket expenditures, or the difference of columns 5 and 4 shown in column 6. These costs and earnings are brought to a present value by using appropriate discount rate.

Mathematical Models Employed

The general criterion for investment decisions is the maximization of net present value of income. Thus, the enumeration and quantification of education costs and benefits are very important to the formulation of decisions on investment in education.

The analysis of costs and benefits is, therefore, intended to provide the necessary rules for determining the future costs and benefits to present equivalents to determine whether the secondary education, as proposed, is at all economically worthwhile.

To compare costs with benefits three criteria are employed: benefit-cost ratio, present value of net benefits and the internal rate-of-return. Only the latter two criteria were used in this study. These criteria were employed to examine the returns to investments in different levels of secondary education in the Bahamas. Many writers argue that each criterion produces different results. The ranking of projects by the present value criterion depends on the rate of discount used to bring all costs and benefits to a given point in time. The internal rate-of-return does not depend on discount rates. It is concerned only with the comparison of costs to benefits and not the total value of either. However, the acquired rates require a selected external discount rate to compare with and to determine the profitability of any project.

Discount Rate

In the Bahamas setting, there are a number of interest rates employed which might be used as discount rates. They vary from about 5 percent in 1960's to 18 percent in 1970's depending on the type and duration of loan. According to the Quarterly Reviews of 1975 (pp. 2-3, 43) and 1977 (pp. 18-19, 43) of the Central Bank of the Bahamas, the Government borrowing interest rate went up from 5 to 7 percent in 1965 to 10+ during 1970-1973. On the other hand, the interest rate for Treasury Bills in 1971 was found to be 8.11 percent. The interest rate for consumer loans went up from 8.9 percent in 1969 to 18 percent in 1975, whereas the interest rate on mortgage loans increased from 9 percent in 1969 to 12.86 percent in 1975. The commerical banks prime rate varied from 9.5 percent to 8.5 percent in 1975.

The interest rates quoted above provided a basis for selecting the discount rates used in this study. The time preference rate of a society and individuals are expected to be different. But the use of more than one discount rate can provide enough variation to meet the expected time preferences. In this study, therefore, selected discount rates of 0,5,6,8,10, and 12 per cent, were employed.

The Mathematical Models

The two models, namely, the present value, and internal rate-of-return, are discussed below.

1. Present value of net benefits. The present value is a calculation of the direct benefit in terms of dollars. It is the sum of the benefits minus the sum of costs, both discounted at an appropriate rate and thus represents the net value today of payments in the future. The magnitude of the present value is sensitive to the discount rate used.

The net present value tells the absolute size of gain due to investment in secondary education. The basic model used to calculate the present value of net benefit (PVNB) is:

$$PVNB = \sum_{t=1}^{n} \frac{Bt}{(1+i)^t} - \sum_{t=1}^{m} \frac{Ct}{(1+i)^t} \quad \cdots\cdots \quad (1)$$

where PVNB is the present value of net benefit, Bt is the monetary benefit in year t, Ct is the cost in year t, n is the working lifetime in years, m is the length of the secondary education, and i is the discount rate.

The study used the present value of benefit model based on the following adjustments.

(a) Benefit side of the model. As indicated elsewhere, the individual earnings are likely to grow by a factor reflecting the compound annual rate of growth of earnings due to economic growth. This adjustment of economic growth has to be made to reflect the actual present value of future earnings. Now, if one designates the economic growth by 'g', the benefit side of the basic formulae will take the following form:

$$\text{PV of benefits} = \text{PVB} = \sum_{t=1}^{n} \frac{Bt\,(1+g)^t}{(1+i)^t} \quad \cdots\cdots \quad (2)$$

The second adjustment that was applied to the benefit side is the 'alpha coefficient' to isolate the influence of factors other than education to earnings. Adding the alpha coefficient, formulae 2 becomes:

$$\text{PVB} = \sum_{t=1}^{n} \alpha \frac{Bt\,(1+g)^t}{(1+i)^t} \quad \cdots\cdots\cdots\cdots \quad (3)$$

The third adjustment to earnings is the employment rate, E, for different age groups and grade level. Formulae 3 will be further adjusted by employment rate (E) as shown below.

$$\text{PVB} = \sum_{t=1}^{n} E\ \alpha \frac{Bt\,(1+g)^t}{(1+i)^t} \quad \cdots\cdots\cdots\cdots \quad (4)$$

This last formula was used in this study.

(b) Cost side of the model. The cost of education is composed of direct and indirect costs. The two segments must be added to get the total cost of education. However, before they are added, an adjustment had to be made to the indirect cost (foregone earnings) by the employment rate, alpha coefficient and economic growth rate. The adjustment to the foregone eanings is the same as shown for the benefit above. Here only the unemployment adjusted is shown in formula 5 below. Thus,

$$\text{PV of total costs} = \sum_{t=1}^{m} \frac{C_1}{(1+i)^t} + \sum_{t=1}^{m} E \frac{C_2}{(1+i)^t} \quad (5)$$

where C1 is direct cost, C2 is foregone earnings, and E is the employment rate.

2. Internal rate-of-return. The internal rate-of-return eliminates the need for a discount rate. The rate, which is internal to the cost and benefit associated with investment in secondary education, reveals the rate of interest the investment is earning. The results obtained by using the model are compared with the various discount rates used in Model 1. The internal rate-of-return has to be greater than a selected social or private discount rate for the secondary education to be considered profitable. The internal rate-of-return model was also adjusted for employment, economic growth, and the alpha coefficient.

Internal rate-of-return is defined in either of the following two equivalent forms:

(a) The interest rate which equates the present value of benefits to the present value of costs, that is, Bt = Ct. This statement can be represented by the graph in Figure 3. The discount rate (in this case translated as being interest rate) at which the curve for benefits intersects the curve for costs is the internal rate-of-return.

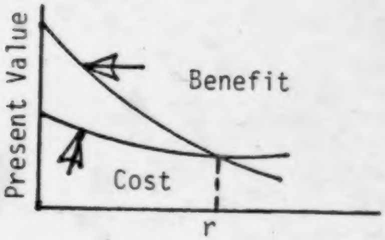

Figure 3: Present Value Curve

'r' where the benefits curve intersected the costs curve is the internal rate-of-return of investment in secondary education.

(b) The second definition of internal rate-of-return is that rate which makes the present value of the benefits minus the present value of costs equal to zero, that is, B-C=0. This statement can be represented by the graph in Figure 4. The discount rate at which the present value of net benefits cuts the x-axis is the internal rate-of-return.

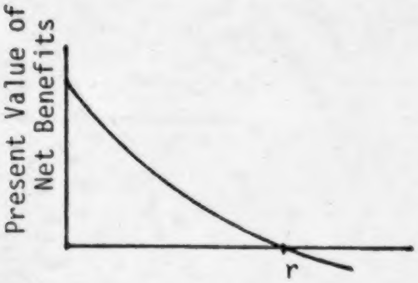

Figure 4: Present Value of Net Benefit Curve

The internal rate-of-return as represented by Figure 4 is the rate at point 'r' where the net benefit curve crosses the x-axis.

SUMMARY

In this chapter the subjects of study, the procedure employed to gather the basic data necessary for the cost-benefit anlaysis of secondary education, the sources of information, and the criteria employed in this study have been discussed.

The subjects of this study were members of the Bahamian male labor force who have had different amounts of secondary education. The source of income data of the male labor force was the 1970 Bahamas Census of Population. On the other hand, the direct social and private costs, representing the 1970-71 academic year, were collected from sampled secondary schools in New Providence by using Questionnaire/Interview technique.

The mathematical models used for this study, namely, present value and internal rate-of-return, were also discussed and the relationship of various variables in each model was shown to serve as basis for computer programing. In addition, six discount rates which are expected to represent the situation in the Bahamas were identified.

Further elaboration of the data utilized and the processes used to disaggregate earnings data and the procedures employed to arrive at the unit cost of secondary education are discussed in Chapter V.

CHAPTER V

METHODS OF DATA COMPILATION

There are two main administrative systems of schools in the Bahamas. First, the Bahamas Government, through the Ministry of Education and Culture, operates and administers schools of all levels from primary through post secondary. In the 1970-71 academic year, the enrollment in Government primary and secondary schools was estimated to be 39,630. Secondly, there are a number of schools operated and administered mainly by different church groups which function indpendently of the Ministry of Education and Culture. These independent bodies accommodated 13,107 students of all levels in the 1970-71 academic year.

Most secondary schools operated by the independent school system opted for government subsidies of 65 percent of their expenditure. However, some secondary schools have withdrawn from the subsidy scheme because they did not want to follow conditions set down by the Government. The subsidy of the Bahamas Government to independent schools is significant. For example, the Government grants-in-aid to independent schools in 1970 fiscal year amounted to $1,474,725. This figure does not include scholarship money of $681,485 which was transferred to independent secondary schools to offset tuition fees and subsistence of some students. Moreover, the independent schools charged tuition fees to meet part of their expenditures. Thus, the direct costs of secondary education for this study had to take into account the expenditures of both Ministry and independent school systems as well as the costs incurred by students.

In this chapter, the processes employed to gather and compile costs and benefits of secondary education are the topics of discussion. The results found in this chapter became the source of data for the analysis reported in Chapter VI.

COST DATA

The direct cost data for the 1970/71 academic year were collected during the months of January and February 1978. The collected data came mainly from two sources.

(a) Questionnaire-Interview. A four page questionnaire, based on the questionnaire of Blaug (1971) was developed. The questionnaire was then presented to the members of the thesis advisory committee for their comment. Secondly, the researcher had the opportunity to discuss the questionnaire with an education official of the Bahamas Ministry of Education and Culture to see if the questions used in the form had relevance to the Bahamas education system. The comments received were incorporated into the final draft of the questionnaire for interviews of educational officials in schools and in the Head Office of the Ministry of Education and Culture. The final draft of the questionnaire was divided into six sections:

1. General information - such as name of school and address, person interviewed, type of school, and so forth;

2. Enrollments of students in 1970-71 academic year;

3. Number of teaching and non-teaching staff in 1970-71 academic year;

4. Expenditure: (a) Recurrent, including subsidies and (b) Capital;

5. Expenditure of students, i.e. for books, supplies, etc.; and

6. Earning of students due to part-time and summer employment.

The full questionnaire is shown in Appendix A.

Because of the limitation of financial resources for this study a decision was made to sample survey only the secondary schools in New Providence. Eight Ministry Secondary schools and nine independent secondary schools were found to be operating in New Providence.

A decision was made to survey only four secondary schools from each category. The schools considered for the random sample and those selected are shown below in Table 10.

All the eight sample schools were visited to solicit information based on the prepared questions. The Government High and the four independent secondary schools had most of the cost data on file. The other Ministry Schools could not provide cost information for 1970-71 academic year, but some

Table 10

List of Selected Secondary Schools in New Providence: 1970-71

List of Secondary Schools	Schools Selected for Cost Survey	Grades Available in Each School
A. Ministry Schools		
1. Baillou Hill High		
2. Government High	Government High	7-13
3. Highbury High	Highbury High	7-12
4. Robinson High		
5. Eastern Secondary		
6. J.J. Kennedy Secondary		
7. Oakes' Field Secondary	Oakes Field Secondary	7-11
8. Pyfrom Road Secondary	Pyfrom Road Secondary	7-11
B. Independent Schools		
1. Aquinas College	Aquinas College	8-12
2. Bahamas Academy	Bahamas Academy	7-11
3. Bahamas Baptist		
4. Prince William's High		
5. Queen's College		
6. St. Andrew's School		
7. St. Anne's High	St. Anne's High	7-13
8. St. Augustine's College	St. Augustine's College	8-12
9. St. John's College		

Source: Annual Report 1970-71

of the information was available from the Ministry of Education and Culture. The Ministry provided data on the costs of physical capital for all four Ministry schools but could not provide the breakdown of the recurrent costs by schools.

(b) Review of Documents. The review of documents was the second source of cost information. The review of documents, particularly the Annual Report 1970-71, was intended to supplement the questionnaire. The documents are cited whenever the references are made.

On the basis of the above two approaches, the basic data were gathered. Table 11 below, shows the number of students and staff in the selected sample schools. The sampled secondary schools had 5704 students, 270 teaching staff, and over 62 non-teaching staff. The students in the sampled schools were found to be 49 percent of all secondary students in New Providence and 46 precent of all the secondary students in the Bahamas.

Direct Social Costs

The social direct costs of secondary education include the total expenditures and have the following expenditure categories.

(a) Direct Costs:

(1) Salaries of teachers and other personnel in schools;

Table 11

Number of Students and Staff in Sampled Secondary Schools; Bahamas: 1970/71

Name of Schools	Number of Students	Number of Staff Teaching	Non-Teaching
A. Ministry Schools			
1. Government High	711	40	16
2. Highbury High	1199	55	NA
3. Oakes' Field Secondary	749	31	11
4. Pyfrom Road Secondary	1070	44	11
Total	3729	170	38+
B. Independent Schools			
1. Aquinas College	426	22	NA
2. Bahamas Academy	202	11	2
3. St. Anne's High	373	17	7
4. St. Augustine's High	974	50	15
Total	1975	100	24+
Grand Total	5704	270	62+

Note: For consistency, the figures are taken from Annual Report 1970-71. However, there were very little difference between the figures given by each school and the Report.

NA - Not Available.

(2) Expenditures on books, equipment, supplies;

(3) Repair and maintenance, and other similar costs;

(4) Administrative costs;

(5) Scholarship and subsidies to students;

(6) Capital costs; and

(b) Indirect Cost:

(7) Foregone earnings before tax.

Other social costs, such as board and room and transportation, were not included in this study because of lack of information. In the expenditure items shown above, the first items represent the recurrent costs whereas item 6 represents capital costs. Item 7 represents the value of productivity foregone.

Recurrent Expenditures

The data for this expenditure category were collected primarily from individual sampled schools. Any departure from the survey is indicated. The expenditures obtained from each sampled school are shown in Table 12 below.

As shown in Table 12, three Ministry schools, namely Highbury High, Oakes' Field Secondary, and Pyfrom Road Secondary could not provide information on scholarships or subsidies. All three schools indicated that their schools were not recipients of scholarship students. They explained that the Government High was the major recipient of

Table 12

Institutional Recurrent Expenditures by Schools and Expenditure Items; Bahamas: 1970-71

Name of Schools	Costs by Expenditure Items			
	Salaries and Wages	Scholarship and Bursary	Books, Equipment, and Supplies	Repairs, Maintenance and Other
1	2	3	4	5
A. Ministry Schools				
1. Government High	335,400	105,600	7,500	12,000
2. Highbury High	NA	-***	NA	NA
3. Oakes' Field Secondary	NA	-***	NA	NA
4. Pyfrom Road Secondary	NA	-***	NA	NA
B. Independent Schools				
1. Aquinas College	206,875	10,035	17,040**	26,839
2. Bahamas Academy	53,213	3,911*	3,486	2,290
3. St. Anne's High	197,500	18,000	15,000	1,500
4. St. Augustine's College	454,818	13,387	26,947	44,365
Total	1,247,806	150,933	69,973	86,994

*Figure obtained from Annual Report 1970-71

**Includes expenditures on fuel, telephone, out of school activities, and medical care.

***The three Ministry schools did not provide any scholarship or subsidy to students.

NA - Not Available

scholarship students. Thus, the three schools were included only in calculating the cost per student in scholarship-subsidy cost category. The institutional recurrent expenditure per student in 1970-71, which were found to be $549.43, are shown in Table 13.

The institutional recurrent cost per student is partial because it does not include the administrative cost incurred by the independent and Ministry schools. The data on administrative cost were not available for the independent secondary schools. Hence, this cost had to be limited to the expenditure of the Ministry of Education and Culture.

The general administrative cost of the Ministry of Education and Culture was found to be difficult to allocate by school. Thus, the approach used to isolate the administrative cost for this study was to separate the budgetary allocations not directly allocated to schools. These costs included salaries of employees working in the Headquarters, and other non-school specific expenditures. In other words, teachers' salaries, direct expenditures on Government High and Post-high institutions, scholarship and subsidies earmarked to schools, and similar expenditures were not included in the administrative expenditures. To isolate this administrative cost from others, the existing documents had to be consulted.

The recurrent expenditure of the Ministry of Education and Culture for 1970-71 academic year was unavailable. The

Table 13

Institutional Recurrent Expenditures Per Student Per Year by Expenditure Items; Bahamas: 1970-71

Cost Items 1	Total Cost (B$) 2	No. of Students 3	Cost/student/ Year (col.2-3) 4
1. Salaries and Wages	1,247,806.00	2686	464.56
2. Scholarship/Bursary	150,933.00	5704	26.44
3. Books, Equipment and Supplies	69,973.00	2686	26.05
4. Repair, Maintenance, and others	86,994.00	2686	32.38
Cost/Student/Year			$549.43

Source: Tables 11 and 12 for number of students and expenditures.

last detailed records on recurrent education expenditures were available for 1970 fiscal year. According to the Annual Report 1970-71; and Approved Estimate of Revenue and Expenditure, Recurrent and Capital (1970), the 1970 administrative cost of education was $2,055,145.00. This included the salaries for personnel in the Ministry of Education and Culture and other non-specific expenditures.

Since the budget allocation refer to the fiscal year, January 1 to December 31, it had to be converted to the academic year which begins the first week of September and ends the first week of July. An academic year, which is of twelve months duration as far as salary is concerned, overlaps two fiscal years. The historical development of total education budget shows that the rate of increase of the budget was around 10 percent per year following the 1970 fiscal year.

In order to calculate the administrative cost of education the fiscal years from 1970 and 1971 had to be prorated to the 1970-71 academic year. For this study the school expenditure in 1970-71 academic year was assumed to be covered by 50 percent of 1970 fiscal budget and 50 percent of 1971 fiscal budget. The administrative cost of the Ministry of Education and Culture for 1970-71 academic year was found to be $2,157,903.00 This administrative cost of 1970-71 was for all of the 39,360 students. Therefore, the administrative cost per student per year is ($2,157,093-

39,630) or $54.45. This administrative cost brings the total institutional recurrent cost per student per year at the secondary level to $603.88.

Capital Cost

The costs of school buildings and equipment and their date of construction could not be obtained during the field survey of the sampled secondary schools. Published documents were not of much help on this topic either. Thus, it was found necessary to approach the Planning Unit of the Ministry of Education and Culture to provide the necessary information to compute the capital average cost per student for 1970-71 academic year.

Even though school buildings and equipment rarely enter the regular rental market, it is still necessary to include the cost of capital which society incurs by computing the annual capital charges or annual rent. For the sake of simplicity, it was assumed that the depreciation of buildings and equipment is a straight line. Based on this assumption, the imputed rent of capital was found by using the following formula:

$$R = A+B, \text{ where } A = \frac{Cr}{(1+r)^t-1}; \text{ and } B = Cr$$

where R is the imputed rent; C is the initial capital cost; r is the interest rate; and t is the expected life of buildings and equipment. The interest rate 'r' of 8 percent was assumed to be appropriate to compute the capital recovery of investment on school construction. The 8 percent takes into account the 6 percent interest rate and other service charges.

Using the capital costs obtained for four Ministry secondary schools and the capital recovery formula shown above, the total capital cost in 1970-71 academic year was found to be $177,061.00 as shown in Table 14.

Since the number of students in the four Ministry Secondary Schools in 1970-71 was 3729, the capital cost per student is, (177,061-3729), $47.48. This capital cost with the recurrent cost calculated earlier completes the picture of institutional direct costs of secondary education. However, the social direct cost includes the costs incurred by students for books, equipment and supplies. This was found to be $15 per student per year. Thus, the social direct cost per student per year was found to be $666. Of the total social cost, salaries and wages of school personnel accounted for 70 percent.

The direct social cost of $666 per student per year in secondary schools, grades 7-13 inclusive, constitutes a part of the total social cost of education. The other part of social cost is the productivity loss which is represented by income foregone by students. This cost aspect is discussed later.

Table 14

Imputed Capital Rent by Schools; Bahamas:1970-71.

Name of School	Expected Life of Buildings and Equipment	Cost of Building When Constructed (B$)	1970-71 (Computed) Rent
1. Government High	30	750,000	66,621
2. Highbury High	25	500,000	46,839
3. Oakes' Field Secondary	30	350,000	31,090
4. Pyfrom Road Secondary	30	366,000	32,511
Total			177,061

Source: Bahamas Ministry of Education and Culture

Direct Private Costs

The direct private costs of education include all school related expenditures incurred by students or their families minus scholarships, subsidies, and income students earn from part-time or summer employment. The private cost categories were itemized as direct and indirect cost as follows.

(a) Direct Costs:

1. Tuition and other school fees,
2. Books, equipment and supplies,
3. Costs of travel to and from school,
4. Extra cost for board and room.

These costs are reduced by

5. Scholarships/bursaries to students, and
6. Income from parttime and summer employment.

(b) Indirect cost:

7. Foregone income while attending school.

The direct private cost data were collected from the individual schools sampled for this study. Other sources have also been consulted and are cited wherever appropriate.

The schools surveyed indicated that travel to and from school was negligible because most of the schools were within walking distance. Very few students resort to public transport or come by family car; therefore, the cost item on student transportation is zero. Furthermore, the extra cost for board and room is considered to be zero for two reasons: (a) Boarding schools are rare in the Bahamas; (b) The board and room expenditure of $63,000 during 1970-71 in one of the surveyed secondary schools could not be separated into its components of extra cost and the normal cost that would have been incurred if the students were living with their families.

Most of the surveyed schools could not provide the exact student expenditures on books, equipment and on other school supplies. Instead they gave estimates as to how much students had spent on the average. These estimates were used to compute the overall average expenditure of students on books, equipment and supplies.

The surveyed schools could not provide any data on student employment and income. However, the school principals and some teachers said that if there were some students working parttime and/or during the summer vacation, they must be very few in number. This opinion was supported by the Ministry of Labour and Youth Employment which speculated that if there was any employment of students it is usually done through family contact rather than the employment office.

The 1970 Census of Bahamas population provided some data on student income. The Report of the 1970 Census of Population (1970:400), and Census Monograph No. 1: Manpower and Income (1973b:43) revealed that 10,518 students (boys and girls) of age 14 and over, in 1970, earned a total of $36,000. But the sources of income were not indicated. Government subsidies could have been the source of income rather than employment. Even if one ignores the sources of income, the income per student per year is only $3.42. But whatever its size, it is unsound to include this income to adjust student expenditures on schooling. Thus, for the purpose of this study, earnings of students during 1970-71 were considered to be zero.

Table 15 shows that the 5704 students in the 8 secondary schools spent a total of $615,310 on tuition and $87,027 on books, equipment and supplies. On the other hand, they received, in a form of subsidies, a sum of $150,933. The net private cost was only [615,310+87,027)-(150,933)] or $551,404.00.

The average direct private cost for each cost item was calculated for each grade from 7-13, inclusive, by using columns 2, 4, 6 and 7 of Table 15, which is shown in Table 16.

Table 15
Direct Private Costs of Secondary Education by Schools and Items of Expenditure; Bahamas: 1970-71

Name of Schools 1	No.of Students 2	Costs by Expenditure Items				
		Tuition/Fees (B$)		Books, Equipment and Supplies (B$)		
		Per Student 3	Total (Col.3x2) 4	Per Student* 5	Total (Cols.5x2) 6	Subsidy (B$) 7
A. Ministry School						
1.Government High	711	no tuition	no tuition	Sch. provides	Sch. provides	105,600**
2.Highbury High	1199	no tuition	no tuition	12	14,388	No subsidy
3.Oakes' Field Sec.	749	no tuition	no tuition	12	8,988	No subsidy
4.Pyfrom Road Sec.		no tuition	no tuition	13	13,840	No subsidy
B. Independent Schools						
1.Aquinas College	426	225	95,850	38	16,188	10,035
2.Bahamas Academy	202	330	66,660	38	7676	3,911***
3.St. Anne's High	373	300	111,900	Sch.provides	Sch.provides	18,000**
4.St. Augustine's College	974	350	340,900	NN	26,947****	13,387
Total	5704		615,310		87,027	150,933

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*The figures given are estimates given by each school.

**The figures include cost of books as well.

***The figure is obtained from Annual Report 1970-71

****The total student expenditure on books, equipment and supplies was obtained from school record

NN-Not necessary

Table 16

Direct Private Cost Per Student Per Year; Bahamas: 1970-71

Cost Items	Amount/Cost (B$)	No. of Students	Cost/student /Year (col.2 3)
1	2	3	4
1. Tutition/Fees	615,310	5704	107.87
2. Books, Equipment and Supplies	87,027	5704	15.26
Gross Cost/Student/Year			123.13
3. Subsidy (-)	150,933	5704	-26.46
Net Cost/Student/year			96.67

As shown in Table 16, the subsidy a student received was subtracted from the direct expenditure reducing the cost per student per year from $123.13 to $96.67.

These average private cost figures can be compared with figures from another study conducted in the Bahamas in 1970. A sample Household Budgetary Survey was conducted in New Providence during June and July, 1970. This survey included expenditures of families for secondary education. In this Household Budgetary Survey Report, 1970 (Apps. III and V.2), 381 (boys and girls) secondary students were found to have spent $38,125 for fees, and $7023.6 for books and equipment. These costs show that a secondary student spent, on the average, $100.07 for fees, and $18.43 for books and equipment or a total of $118.50 per year. The private cost per student per year was found to be $123.13 in this study. The difference between the two studies is not significant.

The direct, social and private costs, which were dealt with above, are part of the total costs of secondary education. To complete the picture of costs of the secondary education, the foregone earnings or loss of productivity of those who attend school must be considered.

Indirect Cost - Foregone Earnings

The foregone earnings were calculated from data collected in the 1970 Census of Population. The Census data analyzed by the Statistics Department of the Bahamas were published in *Census Monograph No. 1: Manpower and Income*. According to the Monograph (1973b:V), personal earnings include:

> Payments for production such as wages and salaries, income for self employment and earned rents, dividends and interests. It also includes payments for which there is no *quid pro quo* or concomitant production. Therefore included in personal income are the receipts of pension and other fee income benefits.

In most rate-of-return studies, earnings were limited to the wages and salaries of the labor force. Other incomes from dividends, and rents were not usually included. There is a question as to whether or not incomes other than salary and wages have anything to do with education. This argument is based on the notion that dividends and rents may have been obtained as a result of acquired wealth from family, which has nothing to do with education-earnings relationship. But the individual may have invested from his own wages and salaries to buy stocks or to build houses for rent which may have some relationship to education. Whatever the case, it was not possible to unravel the income reported in the Census.

As described in Chapter IV, there are no foregone earnings for students up to and including grade 9. The foregone earnings of education are included as costs only for those students who are 15 years of age and over which corresponds to grade 10 and beyond.

The foregone earnings of students in grades 10-13 were computed by using the income of the labor force of the same age who have joined the labor force. A student of 15 years of age attending grade 10 is losing an income equivalent to the average income of persons of 15 years of age with 9 years of education who are members of the labor force.

The costs discussed above serve as one part of cost-benefit analysis of education. The other part is the earnings streams of the male labor force which are discussed below.

EARNINGS DATA

The information for earnings streams of the male labor force is the _1970 Census of Population_ of the Bahamas. According to the _Census Report_ (1970:i) the income data were collected in the census survey of 1970 for the first time.

This study was concerned only with the economically active male labor force. The definition of active labor force as given both in the 1970 Census Report and Census Monograph - No. 1: Manpower and Income are very similar. But for the purpose of this study, the definition given in the Monograph (1973b:V) was adopted.

> The economically active population includes all persons aged 14 years and over, whose major employment situation in the six months previous to the census date April 7th, 1970 was described as employed i.e. engaged in economic activity or unemployed.

The economically active population was classified into three main employment situations, according to the Census Report (1970:iii).

(a) Employed (meaning engaged in economic activity, having any of the different kinds of Economic Status)

(b) Unemployed (temporarily for health reasons)

(c) Unemployed (for other reasons)

Excluded from the economically active population were people classified in one or more of the following categories:

(a) Unemployed (for health reasons - permanent nature)

(b) Unemployed (student, schoolboy or schoolgirl)

(c) Unemployed (housewives)

(d) Retired on pension or otherwise retired for reasons of age

(e) Of independent means

Of the 168,812 of population in 1970, 99,068 were 14 years and over and 69,791 were classified as economically active. The economically active male population accounted for 59.9 per cent of 69,791 or 41,788.

The income of the male labor force was recorded in the *Census Report* and other supplementary documents, such as *Census Monograph - No. 1: Manpower and Income*. However, these compilations were not in a format appropriate to this study. An approach had to be adopted to disaggregate the data.

The Basic Labor and Income Data

Labor Data

The *Report of the 1970 Census of Population* of the Bahamas provided a description of the population by (a) age and education; (b) income by age; (c) income by level of education; (d) income by occupation and economic activity, and so forth. Furthermore, the population was also described by employment situation by age and education separately. The basic information used for this study included the following:

1. *The 1970 male population, 14 years and over, of the Bahamas by education and five-year age-group*. These data are shown in Table 17. In the original documents, the entire population was included. But in Table 17 only the data on males of 14 years and over are included.

Table 17

The Male Population, 14 Years and Over, by Education and Age-Group; Bahamas: 1970

Age Group	Total	Distribution by Years of Education														
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14+
14	1943	37	2	1	4	14	25	61	172	551	854	190	23	7	1	1
15-19	7107	113	19	18	38	46	69	193	324	856	1355	1660	1095	756	335	230
20-24	6205	220	12	20	53	76	133	241	349	884	925	985	609	693	331	674
25-29	6847	269	28	52	67	152	167	336	364	970	972	950	534	690	348	948
30-34	5898	312	32	49	58	144	152	310	370	863	796	742	410	544	255	861
35-39	4664	279	17	54	50	113	144	251	298	724	653	538	286	400	192	665
40-44	3749	213	16	38	43	87	93	224	258	652	529	465	193	266	119	553
45-49	3015	189	16	35	43	79	106	203	234	518	377	316	152	234	104	409
50-54	2852	167	21	25	29	79	122	203	226	553	381	288	129	201	81	347
55-59	2282	165	18	36	33	70	117	179	182	382	297	222	104	162	46	269
60+	3848	534	53	77	91	178	184	299	261	581	402	369	141	217	87	374
Total	48410	2498	234	405	509	1038	1312	2500	3038	7534	7541	6725	3676	4170	1899	5331

Source:- Commonwealth of the Bahama Islands, Report of the 1970 Census of Population: 207

Table 17 includes all of the economically active and inactive male population of the Bahamas. Therefore, the economically active and inactive population here had to be separated before any attempt could be made to determine the average income. As shown in Table 17, there were 48,410 males of which 41,788 were economically active and 6,622 were economically inactive. However, Table 17 provides a reference point against which the following information can be measured.

2. _Distribution of economically active male labor force, age 14 years and over, of the Bahamas by level of education, age-group and employment situation_. The data are shown in Table 18. The original data show distributions of the economically active male labor force by occupation, age-group, and education group. To obtain these, data for all of the occupations were combined. The result shows the employment situation by age and education group.

As shown in Table 18, of the total 41,788 economically active males 14 years and over, 38,798 are classified as employed and 2,990 unemployed or unclassified. Later on it is shown that the unemployed/unclassified group were simply unemployed. The unemployed group was used when income was adjusted by the unemployment rate.

Subtracting the economically active male population shown in Table 18 from Table 17 gives the economically inactive male population by age and education level shown in

Table 18

Distribution of Economically Active Male Labor Force By Education Group, Employment Situation, and Age-Group: Bahamas: 1970

Grade Level Completed 1	Age-Group 2	Total 3	Employment Situation: Unemployed or Unclassified 4	Employment Situation: Employed 5
0	14	27	22	3
	15-19	96	38	58
	20-24	220	46	174
	25-29	269	24	245
	30-39	587	57	530
	40-49	394	40	354
	50-59	316	54	262
	60 +	328	85	243
	Total	2237	366	1871
1-2	14	1	-	1
	15-19	23	13	10
	20-24	33	8	25
	25-29	78	7	71
	30-39	153	7	146
	40-49	102	9	93
	50-59	99	12	87
	60 +	89	9	80
	Total	578	65	513
3-4	14	5	3	2
	15-19	69	30	39
	20-24	131	14	117
	25-29	218	13	205
	30-39	366	20	346
	40-49	251	18	233
	50-59	207	24	183
	60 +	183	32	151
	Total	1430	154	1276

Table 18 cont.

1	2	3	4	5
5-6	14	22	11	11
	15-19	207	44	163
	20-24	368	40	328
	25-29	499	25	474
	30-39	847	37	810
	40-49	615	39	576
	50-59	605	53	552
	60 +	342	58	284
	Total	3505	307	3198
7-9	14	241	119	122
	15-19	1804	250	1554
	20-24	2147	150	1997
	25-29	2299	79	2220
	30-39	3686	146	3540
	40-49	2537	136	2401
	50-59	1950	140	1810
	60 +	885	166	719
	Total	15549	1186	14363
10-11	14	30	22	8
	15-19	1266	210	1056
	20-24	1557	97	1460
	25-29	1475	69	1406
	30-39	1969	54	1915
	40-49	1108	45	1063
	50-59	715	36	679
	60 +	365	41	324
	Total	8485	574	7911

Table 18 cont.

1	2	3	4	5
12-13	14	1	-	1
	15-19	480	63	417
	20-24	951	47	904
	25-29	1029	23	1006
	30-39	1375	32	1343
	40-49	701	22	679
	50-59	474	17	457
	60	206	13	193
	Total	5217	217	5000
14 or	-	-	-	-
	15-19	122	13	109
	20-24	512	26	486
	25-29	915	13	902
	30-39	1495	30	1465
	40-49	931	17	914
	50-59	558	9	549
	60	254	13	241
	Total	4787	121	4666
	Grand Total	41788	2990	38798

Source: Report of the 1970 Census of Population: 134-137

Table 19. The number of economically inactive males in the population differs by less than 0.1 percent from the figure of 6,622 given in Census of Population. This discrepancy was considered to be insignificant.

The distribution by age and education of the labor force is summarized in Table 20. These data were then used in the calculation of the income distribution by age and education.

Income Data

The basic income data which were available in the Census Report are reproduced in Appendix B, Tables B-1 and B-2. The difference between Tables B-1 and B-2, Appendix B, is that while Table B-1 shows the economically active male population by age and income ranges, Table B-2 shows the distribution by education level and income ranges.

The figures shown in Appendix B, Tables B-1 and B-2, required some adjustments before disaggregating the data to cross tabulate the frequency in each income range by age and education.

1. Some of the distributions in Appendix B, Tables B-1 and B-2, are classified in more than a single income ranges. Adjustments were made to limit the distributions of each individual to a single income range without affecting the total in each income range. The adjustment was not very complicated except in a few cases. For example, referring to

Table 19

The Economically Inactive Male Population, 14 Years of Age and Over, by Education and Age-Group; Bahamas: 1970

Age-Group	Total	Distribution by Education														
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
14	1616	10	2	-	3	10	19	45	146	467	723	163	20	7	-	1
15-19	3040	17	7	7	7	8	14	41	93	247	391	897	592	423	188	108
20-24	289	-	-	-	-	-	2	4	2	4	5	23	14	49	24	162
25-29	65	-	1	1	-	1	1	3	1	3	3	6	3	6	3	33
30-34	32	1	-	-	-	-	1	2	1	3	3	2	1	5	2	11
35-39	53	3	-	-	-	-	3	3	2	5	4	3	1	6	3	20
40-44	57	3	-	1	-	1	1	3	2	7	5	7	2	7	3	15
45-49	68	5	1	1	-	-	3	4	4	7	6	6	3	8	4	16
50-54	95	8	-	-	1	1	3	5	6	14	10	8	4	6	2	27
55-59	115	8	-	1	1	1	3	5	8	20	13	11	5	6	2	31
60 & +	1196	206	17	24	29	57	54	87	76	167	116	105	40	70	28	120
Total	6626	261	28	35	41	79	104	202	341	944	1279	1231	685	593	259	544

Source: Tables 17 and 18.

Table 20

Distribution of Economically Active male Labor Force, Age 14 and Over, By Age-Group, Education and Employment Situation; Bahamas: 1970

Age Group	Employment Situation	Total Number	Distribution of Labor by Education 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
14	Employed	150	5	-	1	1	1	3	8	13	43	66	7	1	-	1	-
	Unemployed	177	22	-	-	-	3	3	8	13	41	65	20	2	-	-	-
	Total	327	27	-	1	1	4	6	16	26	84	131	27	3	-	1	-
15-19	Employed	3406	58	5	5	18	21	43	120	199	525	830	636	420	289	128	109
	Unemployed	661	38	7	6	13	17	12	32	32	84	134	127	83	44	19	13
	Total	4067	96	12	11	31	38	55	152	231	609	964	763	503	333	147	122
20-24	Employed	5491	174	10	15	48	69	117	211	323	818	856	902	558	612	292	486
	Unemployed	425	46	2	5	5	7	14	26	24	62	64	60	37	32	15	26
	Total	5916	220	12	20	53	76	131	237	347	880	920	962	595	644	307	512
25-29	Employed	6529	245	25	46	63	142	158	316	350	934	936	900	506	669	337	902
	Unemployed	253	24	2	5	4	9	8	17	13	33	33	44	25	15	8	13
	Total	6782	269	27	51	67	151	166	333	363	967	969	944	531	684	345	915
30-34	Employed	5653	279	31	47	55	137	144	294	354	825	761	721	398	527	247	833
	Unemployed	213	32	1	2	3	7	7	14	15	35	32	19	11	12	6	17
	Total	5866	311	32	49	58	144	151	308	369	860	793	740	409	539	253	850
35-39	Employed	4442	251	15	52	47	107	135	238	285	691	624	519	277	385	184	632
	Unemployed	169	25	2	2	3	6	6	10	11	28	25	16	8	9	5	13
	Total	4611	276	17	54	50	113	141	248	296	719	649	535	285	394	189	645
40-44	Employed	3524	190	15	34	40	80	87	208	243	612	497	440	184	252	113	529
	Unemployed	168	20	1	3	3	6	5	13	13	33	27	18	7	7	3	9
	Total	3692	210	16	37	43	86	92	221	256	645	524	458	191	259	116	538
45-49	Employed	2789	164	13	31	40	73	96	185	217	482	350	296	143	218	96	385
	Unemployed	158	20	2	3	3	6	7	14	13	29	21	14	6	8	4	8
	Total	2947	184	15	34	43	79	103	199	230	511	371	310	149	226	100	393

Table 20 cont.

Age Group	Employment Situation	Total Number	Distribution of Labor by Education														
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
50-54	Employed	2585	132	19	22	25	70	109	182	205	504	348	267	120	189	77	316
	Unemployed	172	27	2	3	3	8	10	16	15	35	23	13	5	6	2	4
	Total	2757	159	21	25	28	78	119	198	220	539	371	280	125	195	79	320
55-59	Employed	1994	130	15	31	28	60	103	158	159	333	261	199	93	150	41	233
	Unemployed	173	27	3	4	4	9	11	16	15	29	23	12	6	6	3	5
	Total	2167	157	18	35	32	69	114	174	174	362	284	211	99	156	44	238
60 & +	Employed	2235	243	32	48	51	100	108	176	151	336	232	234	90	137	56	241
	Unemployed	417	85	4	5	11	21	22	36	34	78	54	30	11	10	3	13
	Total	2652	328	36	53	62	121	130	212	185	414	286	264	101	147	59	254
Grand Total	Employed	38798	1871	180	332	416	860	1103	2096	2499	6103	5761	5121	2790	3428	1572	4666
	Unemployed	2986	366	26	38	52	99	105	202	198	487	501	373	201	149	68	121
	Total	41784	2237	206	370	468	959	1208	2298	2697	6590	6262	5494	2991	3577	1640	4787

Source : Tables 17 and 18.

Table B-1, one finds 52 persons of age 14 distributed among three income ranges from $2001 to $5000. The total number of persons in income range 2001-3000 were recorded to be 7280 which implies that 36 of the 52 persons had to be in the 2001-3000 income range. This logic was applied for each income range in Table B-1 and B-2 to obtain new distributions.

2. It was found necessary to adjust the distribution in the upper income ranges in Table B-1 and B-2 because those distributions were inconsistent with other sources of information.

For example, it was reported in the Census Monograph No. 1: Manpower and Income (1973b:45-47) that the total number in the economically active population in the income range $40,001 and over was 135, 125 in the income range $30,001-$40,000, 463 in the income range $20,001-$30,000, 471 in the income range $17,501-$20,000, and 556 in the income range $15,001-$17,500. The above figures differ from the male labor force distribution of 181, 128, 463, 487, and 559, respectively, reported in Tables B-1 and B-2. In these upper five income groups, the number of males in each group appears to be larger than the total. The number of males in the other income groups appears to be consistent with the total. The discrepancy in the upper five income ranges was corrected by subtracting the number in female labor force in each income range from the total number in each income range. The resulting distribution is shown in Table 21.

3. The data in Appendix B, Tables B-1 and B-2, consist of both employed and unemployed/unclassified economically active males, 14 years and over. The 2,986 unemployed males shown in Table 20, were taken out of the distributions in order to eventually compute the earned income. The numbers of unemployed were all added to column 3 on the assumption that their average earned income was less than $500 per year. In 1970, the 7,357 unemployed persons earned $1,709,000 which comes to an average of $232 per year per person according to Census Monograph (1973b:46-47).

All the above adjustments were made to generate accurate data representing the distribution of employed male labor force. The new data are shown in Tables 22 and 23.

Disaggregation of Labor Force Across Income Ranges

Table 22 consists of a cross-tabulation of employed male labor force by age and income groups while Table 23 consists of a cross-tabulation of the same by education and income groups. A cross-tabulation by age, education and income was created by prorating the frequencies from Tables 22 and 23. Some logical limitations were applied to the prorations. For example, it is highly unlikely that employed males of age fourteen years would have more than nine years of education; therefore, this group was prorated over the first nine years of education. Similar adjustments were applied to school age groups 15 to 18 years. The resulting

Table 21

Adjustments of the Economically Active Male Labor Force Distribution in the Upper Five Income Ranges

Source of Distribution	Distribution in the Upper Five Income Ranges				
	10	11	12	13	14
(1) Distribution of Economically Active Population (male and female), Aged 14 Years and Over, by Income Range (Source: Census Monograph - No. 1: Manpower and Income: 72-75)	556	471	463	125	135
(2) Distribution of Female Population, Aged 14 Years and Over, by Income Range (Source: Report of the 1970 Census of Population: 294 and 389) to be subtracted from '1'.	27	23	24	9	21
(3) Difference - Male Distribution (#1-2)	529	448	439	116	114

Table 22

Distribution of the Employed Male Labor Force by Income Range and Age-Group; Bahamas: 1970

Age Group	Number Total	Distribution by Income Range													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
14	150	33	65	36	11	5	--	--	--	--	--	--	--	--	--
15-19	3406	348	790	1091	685	317	156	14	1	1	1	1	1	--	--
20-24	5491	202	550	1168	1252	1034	856	291	91	24	8	6	2	1	--
25-29	6529	181	551	1090	1047	1160	1264	624	318	167	60	31	30	4	2
30-34	5653	207	445	878	820	856	1047	617	318	201	109	70	67	10	8
35-39	4442	136	384	749	658	644	751	440	239	174	94	89	61	13	10
40-44	3524	197	312	575	526	495	533	305	197	122	60	79	88	17	18
45-49	2789	166	299	487	366	358	399	263	137	98	62	58	60	17	19
50-54	2585	225	363	446	358	306	310	181	107	96	63	48	51	16	15
55-59	1994	215	298	338	262	231	219	127	96	62	36	33	41	17	19
60+	2235	157	494	422	248	246	220	161	83	55	34	33	38	21	23
Total	38798	2067	4551	7280	6233	5652	5755	3023	1593	1000	527	448	439	116	114

Source:- Table 20 and Appendix B, Table B-1.

Note: Income Range

1-$0-$1,000
2-$1,001-$2,000
3-$2,001-$3,000
4-$3,001-$4,000
5-$4,001-$5,000
6-$5,001-$7,500
7-$7,501-$10,000
8-$10,001-$12,500
9-$12,501-$15,000
10-$15,001-$17,500
11-$17,501-$20,000
12-$20,001-$30,000
13-$30,001-$40,000
14-$40,001 +(Midpoint=$45,000)

Table 23

Distribution of the Employed Male Labor Force by Income Range and Education; Bahamas: 1970

Educ. Level	Number Total	Income Range													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	1871	227	419	580	294	176	109	38	13	7	3	2	3	-	-
1	180	32	43	43	29	22	8	3	-	-	-	-	-	-	-
2	332	40	75	98	57	33	18	8	1	1	1	-	-	-	-
3	416	52	72	136	80	23	37	13	1	1	1	-	-	-	-
4	860	72	185	249	182	80	65	16	6	3	1	1	--	--	--
5	1103	104	214	335	203	104	91	33	11	4	1	1	1	1	--
6	2096	117	330	586	413	329	221	55	18	12	4	4	3	1	--
7	2499	199	368	656	470	366	275	103	29	16	7	6	3	1	-
8	6103	363	861	1310	1149	994	924	337	82	37	16	13	13	2	2
9	5761	480	805	1157	1012	570	839	296	92	44	31	17	12	4	2
10	5121	169	514	936	982	932	905	384	134	64	44	25	20	6	6
11	2790	127	222	436	422	494	504	255	151	72	41	26	26	6	8
12	3428	30	218	377	442	521	703	471	265	168	76	60	60	21	16
13	1572	36	56	131	174	195	283	254	175	96	57	44	54	8	9
14	4666	19	169	247	324	413	773	757	615	475	244	249	244	66	71
Total	38798	2067	4551	7280	6233	5652	5755	3023	1593	1000	527	448	439	116	114

Source: Table 20 and Appendix B, Table B-2 data are, which combine the distributions in Tables 22, 23 and Appendix D, are shown in Table 24.

SUMMARY

In this chapter, the methods employed to gather the data and the methods used to compile the data were reviewed. While the cost data were collected by sampling, the benefit data were compiled from the 1970 Census of Population and other documents. The available benefit data were disaggregated to cross tabulate age, education and earnings to compute the mean annual earnings by age-group and education. The social and private costs and mean annual earnings found in this chapter become the source for the data analysis in Chapter VI.

Table 24

Mean Annual Income of Employed Male by Education and Age-Group; Bahamas: 1970

Age Group	Annual Income by Years of Schooling														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
15-19	1793	1100*	1300*	1722	1833	2012	2083	2186	2377	2390	2668	2888	3484	3654	-
20-24	2500	2400**	2683	2752	2799	2748	3008	3167	3348	3383	3907	4370	5120	5809	6777
25-29	2734	2730	2946	3075	3174	3403	3638	3565	4034	4205	4889	5595	6622	7789	8681
30-34	3162	2855	2702	3091	3058	3168	3729	4075	4342	4679	5498	6796	7794	9011	10287
35-39	3169	3283	2957	3330	3210	3393	3857	3935	4457	4795	5583	7027	8105	9545	11289
40-44	3161	2317	3044	3300	3328	3529	3977	4155	4495	4735	5664	7094	8640	10743	12135
45-49	3171	3558**	3452	3100	3137	3521	3893	4149	4367	4674	5535	7226	9072	10654	12837
50-54	2862	2736	2682	3390	2786	3078	3530	3723	4483	4353	5742	6960	8717	10692	12319
55-59	2602	2100	2952	2634	2842	3335	3630	3651	4209	4353	5309	6809	9138	11006	13637
60 +	2884	2094	2573	2804	3158	3076	3442	3555	4315	4066	5241	7472	9431	12036	12925

Source: Appendix Table D-2

*2-5 observations; **8-13 observations; others are 15 or more observations. Note that persons with '0' education show a general tendency of earning more than especially those with 1 or 2 years of education. This result reflects the original income distribution shown in Table 25. For example, whereas persons with zero education were distributed up to and including income 12, persons with education 1, 2, 3 and 4 were limited to income 7, 10, 10, and 11 respectively.

CHAPTER VI

ANALYSIS OF COSTS AND BENEFITS

The problem of this study was to identify and calculate the social and private average and marginal returns to investment in secondary education in the Bahamas.

The methods employed to evaluate costs and earnings, and the general results of the same have been dealt with in the previous chapter. In this chapter, the adjusted and unadjusted social and private present values and internal rates-of-return are analyzed according to each sub-problem identified in Chapter I.

THE FINDINGS

Sub-Problem 1: Social and Private Costs of Secondary Education

Sub-Problem 1a: What are the estimated social costs of investment in general secondary education in the Bahamas?

Adding the contribution of all the social cost items the total direct social cost per student per year was found to be $666.00. The general breakdown of this cost is shown in Table 25.

Table 25

Direct Social Cost of Secondary Education;

Bahamas: 1970-71

Cost Categories	Cost/student/year	% of Total
Recurrent	$619.00*	93.00
Capital	$ 47.00	7.00
Total	$666.00	100.00

Source: Chapter V

*Includes $15 a student spends on books and other school material per year.

The social indirect cost was calculated from earnings of those who chose to work instead of going to school.

Table 26 summarizes the findings of the social direct and indirect costs by age and education. The indirect social cost of education at grade 10 and beyond is very significant accounting for 78 to 84 percent of the total costs.

Sub-Problem 1b: What are the estimated private costs of investment in general secondary education in the Bahamas?

The private costs of secondary education included both direct and indirect costs. The total and net private costs per student per year were found to be $123.00 and $97.00, respectively, as shown in Table 27.

Table 26

Social Mean Earnings Foregone and Direct Cost by Age and Years of Schooling; Bahamas Males: 1970-71*

Age	Cost Category	Social Costs by Schooling (B$)							Total
		7	8	9	10	11	12	13	
14**	Direct	666	666	666					
	Foregone	-	-	-					
15	Direct				666				
	Foregone				2390				
16	Direct					666			
	Foregone					2668			
17	Direct						666		
	Foregone						2888		
18	Direct							666	
	Foregone							3484	
	Total	666	666	666	3056	3334	3554	4150	16092

Source: Table 25 above for direct cost, and Table 24, Chapter V, for foregone earnings.
*All costs are unadjusted, and undiscounted

**All direct costs incurred before the age 15 are assumed to occur at age 14. Secondly, no foregone earnings are included below age 15 because they are assumed to be zero.

Table 27

Direct Private Costs of

Secondary Education, Bahamas: 1970-71

Cost Categories	Cost/student/year	% of Total
Tuition fee	107.87	87.61
Books, equipment, supplies	15.26	12.39
Total	123.13	100.0
Subsidy (-)	26.46	
Net cost/student/year	96.67	

Source: Chapter V

The direct costs shown in Table 27 indicate that the tuition fees of independent secondary schools were responsible for about 88 percent of the costs to students. In this study, the costs incurred in private and public schools were averaged over all the students because the study dealt with the overall costs of secondary education from the national perspective.

Table 28, below, summarizes the findings of the private direct and indirect costs by age and education. The total private cost for an individual who decided to complete his secondary education, 7 - 13 inclusive, was $12,109.00. The relative significance of the direct cost diminishes as the level of education increases.

Table 28

Private Mean Earnings Foregone and Direct Cost by Age and Years of Schooling; Bahamas Males: 1970-71*

Age	Cost Catagory	Private Costs by Schooling Completed (B$)							Total
		7	8	9	10	11	12	13	
14**	Direct	97	97	97					
	Foregone	-	-	-					
15	Direct				97				
	Foregone				2390				
16	Direct					97			
	Foregone					2668			
17	Direct						97		
	Foregone						2888		
18	Direct							97	
	Foregone							3484	
	Total	97	97	97	2487	2765	2985	3581	12109

Source: Table 27 above for direct cost, and Table 24, Chapter V, for foregone earnings.
*All costs are unadjusted, and undiscounted.

**All direct costs incurred before the age 15 are assumed to occur at age 14. Secondly, no foregone earnings are included below age 15 because they are assumed to be zero.

Summary

While the social direct cost per student per year was found to be $666.00, the private direct cost per student per year was $97.00, a ratio of 6.87 to 1. The total social cost for 7 years of secondary education was found to be $16,092.00 whereas the total private cost for the same level was found to be $12,109.00, a ratio of 1.33 to 1. The inclusion of foregone earnings reduced the difference between the social and private costs of secondary education.

Sub-Problem 2: Social and Private Values of Net Benefits

This sub-problem required the social and private costs identified in sub-problem 1 and the mean annual earnings shown in Table 24, Chapter V.

1. Unadjusted Present Values - The marginal earnings and cost data were compared assuming that earning differentials were all due to education. Only the earnings of the employed male labor force were used in this category. These results are shown in column 3 of Tables 29 and 30.

2. Adjusted Present Values - Adjustments were made to the raw earnings assuming that earnings are sensitive to factors other than education. The adjustments employed in this study were:

(a) Unemployment - This is the rate of idleness which the labor force with different amounts of secondary education and age experience during their working lifetime. The results of this adjustment are shown in column 4 of Tables 29 and 30.

(b) Secular Growth of 2 percent - This adjustment was made to reflect future effects of economic growth on earning differentials. These results are shown in column 5 of Tables 29 and 30.

(c) Alpha Coefficient of 60 percent - This adjustment to annual earnings was made on the assumption that only 60 percent of earnings was attributable to secondary education. The rest or 40 percent of earnings was assumed to be due to family background, ability, and the like. The results are shown in column 6 in Tables 29 and 30.

(d) Other adjustments - This category of adjustments was done by combining, in various ways, the three adjustments already mentioned. These combinations were: (1) unemployment rates and secular growth; (2) unemployment rates and alpha coefficient; (3) secular growth and alpha coefficient; and (4) unemployment rates, secular growth and alpha coefficient. The results of the above adjustments are included in columns 7-10, respectively, in Tables 29 and 30.

Sub-Problem 2a: What are the social present values of the marginal earnings streams, when discounted at selected rates, of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

(a) Unadjusted social present values. The unadjusted results are shown in Table 29, column 3.

At a zero percent discount rate, the social present values of grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $5,752; $23,376; $29,731; $63,717; $112,024; $168,276; and $227,091, respectively. Table 29 also shows the marginal present values for the different levels of secondary education. At a zero percent discount rate, the marginal present values of grades 8, 9, 10, 11, 12 and 13 were found to be $17,624; $6,355; $33,986; $48,307; $56,252; and $58,815, respectively. The marginal returns generally were higher for the higher grades. Grade 9 was an exception to this rule.

At a 5 percent discount rate, the social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,634; $6,736; $8,526; $16,996; $28,659; $42,503; and $56,789, respectively. The 5 percent discount rate was found to reduce the returns to between 1/4 and 1/3 of the present values obtained by using zero percent discount rate.

The marginal social present values at a 5 percent discount rate, for the different amounts of secondary education, grades 8, 9, 10, 11, 12 and 13, were found to be $5,103; $1,790; $8,470; $11,663; $13,844; and $14,286, respectively. With the exception of grade 9, the marginal social present values showed a general increase with the

Table 29

Social Present Values of Marginal Lifetime Earnings by Schooling and Adjustments at Different Discount Rates; Bahamas Males: 1970

Level of Educ.	Discount Rates	Unadjusted	Marginal Lifetime Earnings Adjusted by						
			Unemployed	Economic Growth of 2%	Alpha Coef-ficient of 60%	Economic and Unemploy-ment	Alpha and Unemploy-ment	Alpha and Economic	Alpha Economic and Unemployment
1	2	3	4	5	6	7	8	9	10
6-7	0	5752	7814	10015	3185	12792	4421	5742	7409
	5	1634	2866	2684	714	4158	1453	1344	2228
	6	1292	2434	2113	509	3460	1194	1001	1809
	8	809	1808	1328	219	2480	819	530	1222
	10	497	1386	840	32	1849	565	237	843
	12	286	1087	522	-95	1421	386	47	386
6-8	0	23376	24387	42037	13493	42901	14099	24689	25208
	5	6736	7422	10798	3509	11763	4041	5946	6525
	6	5449	6296	8570	2737	9499	3245	4609	5166
	8	3663	4434	5584	1665	6435	2128	2817	3328
	10	2528	3232	3775	984	4551	1406	1731	2198
	12	1770	2414	2619	529	3329	915	1039	1465
6-9	0	29731	30467	52547	17039	53001	17481	30728	31001
	5	8526	9302	13834	4317	14642	4782	7501	7986
	6	6817	7570	10938	3291	11734	3743	5763	6241
	8	4419	5121	6996	1852	7752	2273	3395	3852
	10	2882	3532	4570	930	5276	1320	1943	2366
	12	1852	2453	3006	312	3661	673	1004	1397
6-10	0	63717	64862	115433	36331	117086	37194	67339	68510
	5	16996	17692	28473	8351	29281	8937	15216	15872
	6	13353	14012	22183	6175	22931	6737	11452	12070
	8	8305	8910	13734	3166	14397	3691	6403	6967
	10	5119	5684	8620	1273	9228	1771	3353	3881
	12	3016	3549	5375	29	5942	505	1424	1925

Table 29 cont.

1	2	3	4	5	6	7	8	9	10
6-11	0	112024	111593	205391	64216	203734	64309	120170	119538
	5	28659	29160	48941	14352	49242	14979	26460	26977
	6	22284	22840	37797	10555	38211	11211	19803	20383
	8	13542	14165	22949	5365	23499	6052	10951	11604
	10	8115	8769	14083	2161	14702	2859	5685	6371
	12	4600	5267	8546	103	9198	800	2415	3112
6-12	0	168276	169685	311627	96857	312822	98241	182744	184010
	5	42503	43922	72740	21708	74198	23038	39731	41104
	6	33086	34478	56080	16113	57523	17418	29793	31147
	8	20274	21606	34065	8532	35461	9784	16694	18002
	10	12400	13670	21063	3906	22400	5106	8997	10253
	12	7345	8556	13022	967	14299	2116	4270	5475
6-13	0	227091	225369	421801	131057	416242	130727	247659	245062
	5	56789	57788	97613	29375	98074	30598	53675	54607
	6	44116	45250	75101	21861	75874	23150	40263	41366
	8	26939	28210	45433	11722	46553	13067	22640	23923
	10	16447	17760	27994	5584	29258	6929	12342	13685
	12	9764	11073	17274	1719	18585	3039	6065	7411
7-8	0	17624	16573	32022	10308	30110	9677	18947	17799
	5	5103	4757	8115	2795	7605	2588	6602	4297
	6	4157	3861	6458	2228	6039	2050	3608	3357
	8	2854	2626	4256	1446	3955	1309	2287	2106
	10	2031	1846	2935	952	2703	841	1494	1355
	12	1484	1327	2097	624	1908	530	992	879
7-9	0	23979	22653	42532	13855	40209	13059	24986	23593
	5	6893	6437	11150	3603	10424	3329	6157	5758
	6	5525	5135	8825	2787	8274	2548	4762	4432
	8	3610	3312	5669	1633	5272	1455	2868	2630
	10	2385	2146	3730	898	3427	755	1705	1523
	12	1566	1367	2483	407	2240	287	957	811

Table 29 cont.

1	2	3	4	5	6	7	8	9	10
7-10	0	57965	57049	105418	33105	104294	32677	61555	61004
	5	15362	14827	25789	7598	25123	7393	13832	13551
	6	12061	11578	20070	5628	19471	5453	10412	10169
	8	7496	7101	12406	2909	11917	2784	6833	5655
	10	4622	4298	7781	1204	7380	1119	3078	2950
	12	2730	2462	4852	87	4521	35	1340	1252
7-11	0	106272	103779	195377	60949	190943	59696	114343	111933
	5	27026	26294	46258	13561	45084	13349	25037	24566
	6	20992	20406	35684	9971	34751	9842	18724	18393
	8	12732	12356	21621	5072	21019	5063	10345	10207
	10	7618	7383	13243	2058	12854	2128	5374	5358
	12	4314	4180	8023	128	7777	253	2296	2360
7-12	0	162524	161871	301612	93559	300300	93532	176873	176303
	5	40869	41056	70056	20882	70041	21325	38271	38605
	6	31794	32044	53968	15494	54063	15969	28677	29073
	8	19465	19798	32738	8206	32981	8719	16054	16525
	10	11903	12284	20224	3772	20551	4303	8653	9164
	12	7059	7469	12500	962	21878	1501	4120	4650
7-13	0	221339	217555	411787	127707	403450	125923	241743	237252
	5	55155	54922	94929	28515	93916	28806	52178	52023
	6	42825	42816	72988	21209	72415	21625	39112	39209
	8	26130	26402	44105	11366	44073	11932	21967	22370
	10	15950	16374	27154	5421	27410	6061	11968	12525
	12	9478	9986	16751	1687	17164	2363	5886	6521
8-9	0	6355	6080	10510	3547	10099	3382	6039	5793
	5	1790	1680	3036	808	2879	742	1555	1461
	6	1368	1274	2367	554	2236	498	1154	1075
	8	756	687	1413	187	1317	146	581	524
	10	354	300	795	-54	724	-86	211	168
	12	82	40	386	-217	332	-243	-35	-67

Table 29 cont.

1	2	3	4	5	6	7	8	9	10
8-10	0	40341	40476	73396	22721	74185	22933	42530	43137
	5	10260	10070	17674	4730	17518	4742	9156	9189
	6	7904	7717	13613	3328	13432	3339	6730	6748
	8	4643	4476	8150	1392	7963	1413	3474	3486
	10	2591	2452	4846	182	4677	218	1512	1533
	12	1246	1135	2755	-606	2613	-555	278	313
8-11	0	88648	87206	163355	50488	160833	49885	95238	93996
	5	21923	21538	38143	10624	37479	10637	20288	20141
	6	16835	16545	29227	7603	28712	7669	14971	14910
	8	9879	9731	17365	3490	17065	3636	7917	7978
	10	5587	5538	10308	973	10151	1172	3743	3883
	12	2831	2853	5926	-625	5869	-390	1171	1365
8-12	0	144900	145299	269590	83022	269920	83655	157688	158296
	5	35767	36299	61942	17879	62435	18556	33452	34119
	6	27637	28182	47510	13062	48024	13740	24857	25530
	8	16611	17172	28482	6564	29026	7238	13562	14240
	10	9872	10439	17289	2630	17848	3296	6961	7636
	12	5575	6142	10403	155	10970	811	2938	3605
8-13	0	203715	200982	379764	117094	373341	115979	222475	219172
	5	50053	50166	86814	25449	86311	25982	47292	47478
	6	38668	38954	66531	18716	66376	19343	35226	35610
	8	23276	23776	39849	9668	40119	10402	19414	20032
	10	13919	14529	24219	4227	24707	5008	10219	10948
	12	7994	8659	14654	833	15256	1631	4651	5430
9-10	0	33986	34396	62886	19169	64086	19548	36485	37340
	5	8470	8390	14639	3918	14639	3996	7596	7725
	6	6536	6443	11245	2769	11196	2838	5571	5669
	8	3886	3789	6738	1200	6645	1265	2880	2958
	10	2238	2152	4051	231	3953	301	1297	1361
	12	1164	1096	2369	-393	2282	-315	308	377

Table 29 cont.

1	2	3	4	5	6	7	8	9	10
9-11	0	82293	81126	152845	46931	150734	46497	89188	88195
	5	20133	19858	35108	9807	34600	9889	18724	18674
	6	15467	15271	26859	7039	26477	7165	13807	13829
	8	9123	9044	15952	3294	15747	3484	7326	7448
	10	5233	5238	9513	1018	9427	1252	3523	3709
	12	2748	2814	5540	-417	5538	-153	1197	1427
9-12	0	138545	139219	259081	79459	259821	80263	151632	152491
	5	33976	34619	58906	17057	59557	17804	31882	32649
	6	26269	26908	45142	12494	45789	13233	23688	24445
	8	15855	16485	27069	6363	27708	7083	12967	13076
	10	9518	10139	16493	2671	17124	3374	6737	7459
	12	5493	6102	10017	360	10638	1045	2960	3664
9-13	0	197360	194902	369254	113526	363242	112583	216413	213364
	5	48263	48485	83779	24623	83432	25228	45717	46004
	6	37300	37680	64163	18144	64140	18833	34053	34522
	8	22520	23089	38437	9463	38801	10245	18815	19495
	10	13566	14229	23424	4264	23983	5084	9991	10768
	12	7912	8619	14268	1034	14925	1862	4669	5486
10-11	0	48307	46731	85892	27651	86648	26882	52588	50786
	5	11663	11467	16564	5788	19961	5831	11023	10885
	6	8931	8828	11740	4172	15280	4267	8133	8097
	8	5236	5255	5400	1998	9102	2162	4339	4430
	10	2995	3086	1705	695	5474	896	2131	2290
	12	1584	1718	-531	-112	3256	109	797	994
10-12	0	104559	104823	192128	60068	195736	60581	114914	115011
	5	25507	26229	40363	12942	44917	13689	24079	24799
	6	19733	20465	30023	9533	34593	10279	17915	18654
	8	11969	12696	16517	4979	21063	5708	9886	10632
	10	7280	7987	8685	2264	13172	2967	5256	5987
	12	4329	5007	3945	585	8356	1259	2475	3181

Table 29 cont.

1	2	3	4	5	6	7	8	9	10
10-13	0	163374	160507	302302	94023	299156	92834	179575	175811
	5	39793	40095	65236	20417	68793	21058	37816	38095
	6	30764	31237	49044	15095	52944	15826	28184	28674
	8	18633	19300	27884	7998	32156	8821	15645	16368
	10	11328	12077	15616	3782	20030	4632	8428	9247
	12	6748	7524	8197	1189	12643	2034	4109	4958
11-12	0	56252	58093	98247	32330	109087	33625	62233	64146
	5	13844	14762	16326	7078	24956	7794	12976	13845
	6	10802	11638	10907	5288	19312	5949	9703	10491
	8	6732	7441	3924	2911	11961	3488	5473	6140
	10	4285	4901	-37	1503	7698	2016	3055	3637
	12	2744	3289	-2374	635	5100	1097	1612	2130
11-13	0	115067	113776	208421	66197	212508	65804	126798	124866
	5	28120	28628	41199	14480	48832	15101	26634	27075
	6	21833	22410	29927	10780	37664	11437	19897	20446
	8	13397	14045	15292	5865	23054	6545	11162	11816
	10	8332	8991	6893	2960	14556	3629	6162	6842
	12	5163	5806	1877	1183	9387	1825	3185	3856
12-13	0	58815	55683	96553	33629	103420	31934	64308	60455
	5	14286	13866	12455	7206	23876	7105	13445	13011
	6	11030	10772	6821	5303	18351	5294	9989	9745
	8	6665	6604	-415	2779	11093	2877	5500	5481
	10	4047	4090	-4461	1295	6858	1446	2931	3024
	12	2419	2517	-6771	396	4287	572	1409	1557

Source: Table 24 and 27, Appendix C, and as described in the text.

increase in grade levels.

At a 6 percent discount rate, the social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,292; $5,449; $6,817; $13,353; $22,284; $33,086; and $44,116, respectively. The marginal social present values at a 6 percent discount rate at the different levels of secondary education, that is grades 8, 9, 10, 11, 12 and 13, were found to be $4,157; $1,368; $6,536; $8,931; $10,802; and $11,030, respectively. With the exception of grade 9, the marginal present values at the secondary level were found to increase as the level of education increased.

At an 8 percent discount rate, the social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $809; $3,663; $4,419; $8,305; $13,542; $20,274; and $26,939, respectively.

The marginal social present values at an 8 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,854; $756; $3,886; $5,236; $6,732; and $6,665, respectively. At an 8 percent discount rate, the marginal return to grade 13 was found to be slightly lower than the marginal return to grade 12.

At a 10 percent discount rate, the social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $497; $2,528; $2,882; $5,119; $8,115; $12,400; and $16,447, respectively.

The marginal social present values at a 10 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,031; $354; $2,238; $2,995; $4,285; and $4,047, respectively. The maximum marginal social present value was found for grade 12.

At a 12 percent discount rate, the social present value for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $286; $1,770; $1,852; $3,016; $4,600; $7,345; and $9,764, respectively.

The marginal social present values at a 10 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,484; $82; $1,164; $1,584; $2,744; and $2,419, respectively. At a 12 percent discount rate, the marginal social present value to 8 years of education was found to be higher than the marginal social value to 10 years of education. The highest marginal social return, at a 12 percent discount rate, was for 12 years of education.

Within secondary education, the marginal social return to the 9th year of education was found to be the lowest with every discount rate employed in this study. At a discount rate of 8 percent and above, the marginal social return to the 12th year of education was found to be the highest. At discount rates below 8 percent the marginal social returns generally increased as the grade level increased.

(b) Unemployment adjusted social present values. The results of adjusting for unemployment are shown in Table 29, column 4.

At a zero present discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $7,814; $24,387; $30,467; $64,862; $111,593; $169,685; and $225, 369, respectively. Except at grades 11 and 13, the unemployment adjusted social present values were found to be higher than the unadjusted values.

The marginal unemployment adjusted social present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $16,573; $6,080; $34,396; $46,731; $58,093; and $55,683, respectively. The marginal returns to grades 10 and 12 were found to be higher than the unadjusted ones. The other marginal values were found to be lower than the unadjusted ones.

At a 5 percent discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,886; $7,442; $9,302; $17,692; $29,160; $43,922; and $57,788, respectively. The adjusted social values to secondary education at 5 percent discount rate were found to be higher than the unadjusted values.

The marginal unemployment adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be $4,757; $1,680; $8,390; $11,467; $14,762; and $13,866, respectively. These marginal present values were found to be lower than the unadjusted ones except for grade 12.

At a 6 percent discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,434; $6,296; $7,570; $14,012; $22,840; $34,478; and $45,250, respectively. The unemployment adjusted present values were found to be higher than the unadjusted present values.

The unemployment adjusted social marginal present values at a 6 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $3,861; $1,274; $6,443; $8,828; $11,638; and $10,772, respectively. At a 6 percent discount rate the marginal unemployment adjusted social present value to grade 12 was found to be higher than the respective unadjusted value.

At an 8 percent discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,808; $4,434; $5,121; $8,910; $14,165; and $21,606, respectively. All of these present values were found to be higher than the unadjusted present values.

The marginal unemployment adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at an 8 percent discount rate were found to be $2,626; $687; $3,789; $5,255; $7,441; and $6,604, respectively. Except for grades 11 and 12, the adjusted present values were found to be lower than the unadjusted present values.

At a 10 percent discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,386; 3,232; $3,532; $5,684; $8,769; $13,670; and $17,760, respectively. All these present values were found to be higher than the unadjusted present values.

The marginal unemployment adjusted social present values at 10 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,846; $300; $2,152; $3,086; $4,901; and $4,090, respectively. The marginal adjusted social present values to grades 11, 12 and 13 were found to be higher than the unadjusted values.

At a 12 percent discount rate, the unemployment adjusted social present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $1,087; $2,414; $2,453; $3,549; $5,267; $8,556; and $11,073, respectively. All these present values were found to be higher than the unadjusted values.

The marginal unemployment adjusted social present values at 12 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,327; $40; $1,096; $1,718;

$3,289; and $2,517, respectively. The marginal adjusted social present values for grades 8, 9 and 10 were lower than the respective unadjusted values while the rest were found to be higher than the unadjusted values.

The unemployment adjusted social present values of every grade at the secondary level over the primary level were found to be higher than the unadjusted values at most discount rates employed in this study. The exceptions are the returns to grades 11 and 13 over grade 6 at a zero percent discount rate. The marginal unemployment adjusted social present values for different grades at the secondary level as compared to the unadjusted ones were found to depend on the levels compared and the discount rates employed. By and large, the ~~marginal~~ present values for lower grades were found to be lower than the unadjusted values while the marginal present values for upper grades were found to be higher than the unadjusted values.

(c) Economic growth adjusted social present values. The results of adjusting for economic growth are shown in Table 29, column 5.

At a zero percent discount rate, the economic growth adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $10,015; $42,037; $52,547; $115,433; $205,391; $311,627; and $421,801, respectively. All of these present values were found to be higher than the unadjusted present values. The smallest and largest differences between the adjusted and the unadjusted social present values were those found for grades 7 and 13, respectively.

The marginal economic growth adjusted social present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $32,022; $10,510; $62,886; $85,892; $98,247; and $96,553, respectively. All of these present values were found to be higher than the unadjusted values.

At a 5 percent discount rate, the economic growth adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,684; $10,798; $13,834; $28,473; $48,941; $72,740; and $97,613, respectively. The adjusted social values were found to be higher than the unadjusted values. The lowest difference of 60 percent was found for grade 8 and the highest for grade 13.

The marginal economic adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be $8,115; $3,036; $14,639; $16,564; $16,326; and $12,455, respectively. The marginal value for grade 13 was below the respective unadjusted value while the rest were found to be higher than the unadjusted values.

At a 6 percent discount rate, the economic growth adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,113; $8,570; $10,938; $22,183; $37,797; $56,080; and $75,101, respectively. The adjusted social values were found to be higher than the corresponding unadjusted values.

The marginal economic growth adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at a 6 percent discount rate were found to be $6,458; $2,367; $11,245; $11,740; $10,907; and $6,821, respectively. The marginal adjusted value for grade 13 was below the unadjusted value by 38 percent.

At an 8 percent discount rate, the economic growth adjusted present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,328; $5,584; $6,996; $13,734; $22,949; $34,065; and $45,433, respectively. These adjusted social present values were found to be higher than the corresponding unadjusted social present values.

The marginal economic growth adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at an 8 percent discount rate were found to be $4,256; $1,413; $6,738; $5,400; $3,924; and $415, respectively. While the adjusted marginal present values for grades 8, 9, 10 and 11 were higher than the corresponding unadjusted values, the marginal adjusted value for grade 12 was below the unadjusted value. The adjusted present value for grade 13 changed sign from a positive value at a 6 percent discount rate to negative (-$415) at an 8 percent discount rate.

At a 10 percent discount rate, the economic growth adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $840; $3,775; $4,570; $8,620; $14,083; $21,063; and $27,994, respectively. These adjusted present values were found to be higher than the corresponding unadjusted social present values.

The marginal economic growth adjusted social present values for grades 8, 9, 10 11, 12 and 13 at a 10 percent discount rate were found to be $2,935; $795; $4,051; $1,705; -$37; and -$4,461, respectively. While the adjusted marginal present values for grades 8, 9 and 10 were higher than the corresponding unadjusted values, the marginal adjusted value for grade 11 was lower than the unadjusted value. On the other hand, the adjusted marginal present values of grades 12 and 13 were found to be negative $37 and $4,461, respectively.

At a 12 percent discount rate, the economic growth adjusted present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $522; $2,619; $3,006; $5,375; $8,546; $13,022; and $17,274, respectively. These adjusted present values were found to be higher than the corresponding unadjusted social present values.

The marginal economic growth adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at a 12 percent discount rate were found to be $2,097; $386; $2,369; -$531;

-$2,374; and -$6,771, respectively. The adjusted marginal social present values for grades 8, 9 and 10 were higher than the corresponding unadjusted values. On the other hand, the adjusted marginal social present values of grades 11, 12 and 13 were negative $531, $2,374, and $6,771, respectively.

The economic growth adjusted social present value of each secondary grade over primary were found to be substantially higher than the unadjusted present value at every discount rate employed in this study. However, this was not reflected in all of the marginal values. For example, the marginal economic growth adjusted social present values of grades 11, 12 and 13 were found to be lower than the unadjusted present values at and beyond 10, 8 and 5 percent discount rates, respectively. The marginal adjusted present values of grades 11,12 and 13 were negative at and beyond 12, 10, and 8 percent discount rates, respectively.

(d) Alpha coefficient adjusted social present values. The alpha adjusted results are shown in Table 29, column 6.

At a zero percent discount rate, the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $3,185; $13,493; $17,039; $36,331; $64,216; $96,857; and $131,057, respectively. These adjusted present values were below the respective unadjusted present values by about 40 percent.

The marginal alpha adjusted social present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $10,308; $3,547; $19,169; $27,651; $32,330; and $33,629, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 5 percent discount rate, the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $714; $3,509; $4,317; $8,351; $14,352; $21,708; and $29,375, respectively. These adjusted present values were below the respective unadjusted present values.

The marginal alpha adjusted social present values at a 5 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,795; $808; $3,918; $5,788; $7,078; and $7,206, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 6 percent discount rate, the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $509; $2,737; $3,291; $6,175; $10,555; $16,113; and $21,861, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted social present values at a 6 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,228; $554; $2769; $4,172; $5,288; and $5,303, respectively. All the adjusted marginal present values were below the unadjusted values.

At an 8 percent discount rate the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $219; $1,665; $1,852; $3,166; $5,365; $8,532; and $11,722, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted social present values at an 8 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,446; $187; $1,200; $1,998; $2,911; and $2,779, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 10 percent discount rate, the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $32; $984; $930; $1,273; $2,161; $3,906; and $5,584, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at 10 percent discount rate were found to be $952; -$54; $231; $695; $1,503; and $1,295, respectively. At a 10 percent discount rate, the alpha adjusted marginal social present value of grade 9 was negative $54.

At a 12 percent discount rate, the alpha adjusted social present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be -$95; $529; $312; $29; $103;

$967; and $1,719; respectively. The alpha adjusted social present value of grade 7 was negative $95.

The marginal alpha adjusted social present values for grades 8, 9, 10, 11, 12 and 13 at a 12 present discount rate were found to be $624; -$217; -$393; -$112; $635; and $396, respectively. The adjusted present values of grades 9, 10 and 11 were negative $217, $393, and $112, respectively.

The alpha adjusted social present values of secondary education over primary were found to be about 60 percent of the unadjusted present values at a zero percent discount rate, the magnitude decreasing as the discount rates increased. In some cases, the alpha adjusted social present values were found to be negative. For example, the alpha adjusted social present values of grade 7 was found to be negative at and beyond 12 percent discount rate. The alpha adjusted marginal social present values of grades 9, 10 and 11 were found to be negative at and beyond 10, 12 and 12 percent discount rates, respectively.

(e) Other adjustments. The social present values adjusted by (1) economic growth and unemployment, (2) unemployment and alpha, (3) economic growth and alpha, and (4) economic growth, alpha and unemployment are shown in Table 29, columns 7, 8, 9 and 10, respectively.

At a zero percent discount rate, the social present values for grades 7 to 13 over grade 6 were found to be the highest when data were adjusted by economic growth and unemployment, followed by the values adjusted either by economic growth, alpha and unemployment, or economic growth and alpha; and unemployment and alpha, in that order. The unadjusted social present values for grades 7 to 13 were found to be higher than the values adjusted by unemployment and alpha.

The marginal social present values for grades 8, 9, 10, 11, 12 and 13 at a zero percent discount rate were found to be the highest when data were adjusted by economic growth and unemployment, and the lowest present values were found when data were adjusted by unemployment and alpha. The marginal social present values adjusted by economic growth and alpha, and economic growth, alpha and unemployment fell between the two extremes. The marginal unadjusted social present values were found to be higher than the values adjusted by unemployment and alpha.

At a 5 percent discount rate, the social present values for grades 7 to 13 over grade 6 were found to be the highest when data were adjusted by economic growth and unemployment, followed by the values adjusted by economic growth, alpha and unemployment; economic growth and alpha; and unemployment and alpha, in that order. The unadjusted social present values for grades 7 to 13 were found to be higher than the values adjusted by economic growth and alpha; economic growth, alpha and unemployment; and unemployment and alpha.

The marginal social present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be the highest when data were adjusted by economic growth and unemployment, and the lowest present values were found when data were adjusted by unemployment and alpha. The marginal social present values adjusted by economic growth and alpha, and economic growth, alpha and unemployment fell between the two extremes. The marginal unadjusted social present values were found to be higher than the values adjusted by economic growth and alpha; economic growth, alpha and unemployment; and unemployment and alpha.

The relative magnitutes of the social present values for grades 7 to 13 over grade 6 and the marginal social present values for grades 8, 9, 10, 11, 12 and 13 described under the 5 percent discount rate also apply to the values found at 6, 8, 10 and 12 percent discount rates. The unemployment and alpha adjusted marginal social present value for grade 9 was found to be negative at and beyond a 10 percent discount rate. Moreover, the economic growth and alpha; and economic growth, alpha and unemployment adjusted marginal social present values for grade 9 were found to be negative at a 12 percent discount rate.

Summary

The social present values for grades 7 to 13 over grade 6 were found to be the highest when earnings were adjusted by economic growth and unemployment, followed, in descending order, by the values adjusted by economic growth; unemployment; unadjusted; economic growth, and alpha; and alpha at most discount rates employed in this study.

The marginal social present values for grades 8, 9 and 10 were found to be the highest when earnings were adjusted by economic growth, followed, in descending order, by the values adjusted by economic growth and unemployment; unadjusted; unemployment; economic growth and alpha, or economic growth, alpha and unemployment; unemployment and alpha, or alpha at most discount rates beyond zero percent. The adjusted and unadjusted relative magnitudes of the marginal social present values for grades 11, 12 and 13 were found to vary with the discount rates employed. This variation was primarily due to the influence of economic growth on marginal values. For example, while the economic growth adjusted marginal social present value for grade 13 was found to be the second highest at zero percent discount rate, the value was found to be the sixth highest at 5 and 6 percent discount rate, and the lowest at 8 and higer percent discount rates.

Sub-Problem 2b: What are the private present values of the marginal earnings streams, when discounted at selected rates, of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

(a) Unadjusted private present values. The unadjusted results are shown in Table 30, column 3.

At a zero percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $6,321; $24,514; $31,438; $65,993; $114,869; $171,690; and $231,074, respectively. Table 30 also shows the marginal present values for the different levels of secondary education. At a zero percent discount rate, the marginal present values for grades 8, 9, 10, 11, 12 and 13 were found to be $18,193; $6.924; $34,555; $48,876; $56,821; and $59,384, respectively. The marginal returns were higher for the higher grades. Grade 9 was the exception to this rule.

At a 5 percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $2203; $7874; $10,233; $19,245; $31,424; $45,759; and $60,514, respectively. The 5 percent discount rate was found to reduce the returns to between 1/4 and 1/3 of the present values obtained by using zero percent discount rate.

The marginal private present values at a 5 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $5,672; $2,359; $9,012; $12,179; $14,335; and $14,754, respectively. With the exception of grade 9, the marginal private present values showed a general increase with the increase in grade levels.

Table 30

Private Present Values of Marginal Lifetime Earnings by Schooling and Adjustments at Different Discount Rates, Bahamas Males: 1970

Level of Educ.	Discount Rates	Marginal Lifetime Earnings Adjusted by							
		Unadjusted	Unemployed	Economic Growth of 2%	Alpha Coefficient of 60%	Economic and Unemployment	Alpha and Unemployment	Alpha and Economic	Alpha, Economic and Unemployment
1	2	3	4	5	6	7	8	9	10
6-7	0	6321	8383	10584	3754	13361	4991	6311	7978
	5	2203	3435	3253	1283	4726	2022	1913	2797
	6	1861	3003	2682	1078	4029	1763	1570	2378
	8	1378	2377	1897	788	3049	1388	1099	1791
	10	1066	1955	1409	601	2418	1134	806	1412
	12	855	1657	1091	474	1990	955	616	1155
6-8	0	24514	25525	43175	14631	44039	15237	25827	26346
	5	7874	8760	11936	4647	12901	5179	7084	7663
	6	6587	7434	9708	3875	10637	4383	5747	6304
	8	4801	5572	6722	2803	7573	3266	3955	4466
	10	3666	4370	4913	2122	5689	2544	2870	3336
	12	2908	3552	3757	1667	4467	2053	2177	2603
6-9	0	31438	32174	54254	18746	54708	19188	32436	32708
	5	10233	11009	15541	6024	16349	6489	9208	9693
	6	8524	9277	12645	4998	13441	5450	7470	7948
	8	6126	6828	8703	3559	9459	3980	5106	5559
	10	4589	5239	6277	2637	6983	3027	3650	4073
	12	3559	4160	4713	2019	5368	2380	2711	3104
6-10	0	65993	67138	117720	38607	119373	39470	69626	70798
	5	19245	19942	30732	10600	31540	11185	17476	18132
	6	15597	16256	24437	8419	25185	8981	13707	14325
	8	10539	11144	15978	5400	16642	5925	8647	9211
	10	7344	7908	10855	3497	11463	3995	5588	6116
	12	5231	5764	7600	2244	8168	2720	3649	4150

Table 30 cont.

1	2	3	4	5	6	7	8	9	10
6-11	0	114869	114438	208271	67061	206614	67154	123049	122417
	5	31424	31925	51738	17117	52039	17744	29256	29773
	6	25034	25590	40578	13305	40992	13961	22584	23164
	8	16263	16887	25700	8087	26251	8774	13702	14356
	10	10809	11464	16807	4856	17426	5554	8409	9095
	12	7269	7936	11243	2771	11895	3468	5112	5809
6-12	0	171690	173099	315110	100281	316305	101655	186227	187493
	5	45759	47178	76058	24965	77516	26295	43049	44422
	6	36314	37706	59368	19341	60812	20646	33081	34436
	8	23448	24780	37279	11705	38692	12957	19926	21234
	10	15522	16792	24241	7028	25578	8228	12175	13431
	12	10418	11629	16149	4040	17426	5189	7397	8602
6-13	0	231074	229352	425900	135039	420341	134710	251758	249161
	5	60514	61513	101438	33100	101899	34322	57500	58432
	6	47795	48928	78877	25539	79651	26828	44039	45142
	8	30530	31802	49117	15314	50237	16659	26324	27607
	10	19958	21271	31592	9094	32857	10439	15940	17284
	12	13199	14508	20792	5154	22104	6474	9583	10929
7-8	0	18193	17142	32591	10877	30679	10246	19516	18368
	5	5672	5326	8684	3364	8174	3157	5171	4866
	6	4726	4430	7027	2797	6608	2619	4177	3926
	8	3423	3195	4825	2015	4524	1878	2856	2675
	10	2600	2415	3504	1521	3272	1410	2063	1924
	12	2053	1896	2666	1193	2477	1099	1561	1448
7-9	0	25117	23791	43670	14993	41347	14197	26124	24731
	5	8031	7575	12288	4741	11622	4467	7295	6896
	6	6663	6273	9963	3920	9412	3686	5900	5570
	8	4748	4450	6806	2771	6410	2593	4006	3768
	10	3523	3284	4868	2036	4565	1893	2843	2661
	12	2704	2505	3621	1545	3378	1425	2095	1949

Table 30 cont.

1	2	3	4	5	6	7	8	9	10
7-10	0	59672	58756	107136	34812	106013	34384	63273	62723
	5	17042	16507	27480	9278	26814	9073	15523	15242
	6	13736	13253	21756	7302	21156	7127	12097	11954
	8	9161	8766	14082	4574	13593	4449	7509	7330
	10	6278	5953	9446	2859	9045	2775	4743	4615
	12	4376	4108	6509	1733	6178	1681	2996	2908
7-11	0	108548	106055	197687	63225	193253	61972	116653	114243
	5	29222	28490	48485	15757	47312	15545	27265	26794
	6	23173	22587	37897	12152	36963	12023	20936	20606
	8	14885	14509	23804	7225	23202	7216	12528	12390
	10	9743	9509	15398	4184	15009	4254	7529	7513
	12	6414	6280	10152	2227	9905	2352	4424	4488
7-12	0	165369	164716	304527	96404	302944	96377	179788	179218
	5	43557	43744	72806	23570	72790	24013	41020	41354
	6	34453	34703	56687	18153	56783	18628	31397	31792
	8	22069	22402	35400	10811	35643	11323	18716	19187
	10	14456	14837	22832	6325	23160	6856	11262	11772
	12	9563	9974	15058	3467	15436	4005	6678	7208
7-13	0	224753	220969	415317	131121	406981	129337	245273	240782
	5	58311	58078	98185	31671	97172	31962	55434	55279
	6	45934	45925	76165	24319	75622	24734	42319	42417
	8	29152	29424	47220	14389	47188	14955	25082	25485
	10	18892	19316	30183	8363	30439	9003	14997	15554
	12	12344	12852	19701	4555	20114	5229	8836	9470
8-9	0	6924	6649	11079	4116	10668	3951	6608	6362
	5	2359	2249	3605	1377	3448	1311	2124	2030
	6	1937	1843	2936	1123	2805	1067	1723	1644
	8	1325	1256	1982	756	1886	715	1150	1093
	10	923	869	1364	515	1293	483	780	737
	12	651	609	955	352	901	326	534	502

Table 30 cont.

1	2	3	4	5	6	7	8	9	10
8-10	0	41479	41614	74545	23859	75334	24071	43697	44286
	5	11371	11181	18796	5841	18639	5852	10277	10311
	6	9010	8823	14729	4433	14548	4445	7846	7864
	8	5738	5571	9257	2488	9069	2509	4581	4592
	10	3678	3538	5943	1268	5773	1304	2609	2629
	12	2323	2212	3842	472	3700	522	1365	1400
8-11	0	90355	88913	165096	52195	162574	51592	96980	95737
	5	23550	23165	39802	12251	39138	12264	21947	21800
	6	18447	18157	30870	9215	30355	9282	16615	16554
	8	11463	11314	18979	5074	18679	5219	9531	9592
	10	7143	7094	11894	2530	11737	2728	5329	5469
	12	4361	4384	7485	905	7428	1141	2731	2924
8-12	0	147176	147575	271935	85298	272266	85931	160033	160641
	5	37885	38418	64122	19997	64615	20674	35632	36300
	6	29727	30272	49660	15152	50175	15830	27007	27680
	8	18647	19207	30575	8599	31119	9274	15655	16333
	10	11856	12423	19328	4614	19888	5280	9001	9676
	12	7510	8078	12392	2091	12958	2746	4927	5594
8-13	0	206560	203827	382725	119939	376302	118824	225436	222133
	5	52639	52752	89501	28036	88998	28569	49979	50165
	6	41208	41495	69169	21257	69014	21884	37864	38248
	8	25750	26230	42395	12121	42665	12856	21960	22578
	10	16292	16901	26679	6599	27167	7381	12680	13408
	12	10291	10956	17035	3130	17636	3928	7032	7810
9-10	0	34555	34965	63467	19738	64666	20117	37065	37920
	5	9012	8932	15191	4460	15192	4538	8148	8278
	6	7073	6979	11793	3305	11744	3375	6118	6217
	8	4413	4316	7275	1727	7183	1791	3426	3496
	10	2755	2669	4578	749	4480	818	1824	1889
	12	1672	1604	2887	115	2800	193	826	895

Table 30 cont.

1	2	3	4	5	6	7	8	9	10
9-11	0	83431	82264	154017	48069	151906	47635	90361	89368
	5	21191	20915	36197	10865	35690	10947	19813	19763
	6	16510	16314	27934	8082	27551	8206	14882	14903
	8	10137	10059	16997	4308	16792	4498	8371	8492
	10	6221	6225	10530	2000	10444	2239	4540	4726
	12	3710	3775	6530	545	6528	809	2187	2417
9-12	0	140252	140926	260857	81166	261597	81970	153408	154268
	5	35526	36169	60518	18607	61168	19354	33493	34260
	6	27790	28429	46724	14015	47370	14754	25269	26027
	8	17321	17952	28593	7829	29233	8550	14491	15231
	10	10933	11554	17964	4086	18595	4789	8207	8929
	12	6859	7469	11436	1726	12058	2411	4379	5084
9-13	0	199636	197178	371646	115802	365634	114859	218806	215756
	5	50280	50503	85897	26641	85550	27246	47835	48122
	6	39271	39652	66233	20116	62210	20804	36122	36591
	8	24404	24974	40414	11348	40778	12130	20792	21472
	10	15369	16032	25315	6068	25874	6887	11883	12660
	12	9640	10347	16079	2762	16736	3591	6481	7298
10-11	0	48876	47300	87634	28220	47240	27451	53180	51378
	5	12179	11983	18223	6304	20498	6348	11560	11422
	6	9437	9334	13383	4678	15807	4774	8660	8624
	8	5724	5743	7014	2486	9610	2649	4847	4937
	10	3466	3556	3291	1165	5963	1366	2620	2779
	12	2038	2172	1028	341	3728	563	1269	1466
10-12	0	105697	105961	194473	61206	196931	61719	116110	116207
	5	26514	27237	42543	13950	45976	14697	25138	25858
	6	20717	21450	32173	10517	35626	11263	18949	19688
	8	12908	13636	18610	5919	22050	6648	10873	11619
	10	8178	8884	10725	3162	14115	3865	6199	6930
	12	5187	5865	5934	1443	9258	2118	3370	4083

Table 30 cont.

1	2	3	4	5	6	7	8	9	10
10-13	0	165081	162214	305263	95730	300968	94541	181386	177623
	5	41269	41571	67923	21893	70359	22534	39381	39660
	6	32198	32672	51682	16530	54466	17261	29706	30195
	8	19991	20658	30430	9356	33596	10178	17085	17807
	10	12614	13363	18076	5068	21394	5918	9792	10610
	12	7968	8744	10577	2409	13936	3254	5402	6251
11-12	0	56821	58662	100592	32899	109691	34194	62837	64750
	5	14335	15253	18507	7570	25478	8285	13498	14367
	6	11280	12115	13057	5766	19819	6427	10210	10998
	8	7184	7893	6018	3363	12440	3939	5952	6619
	10	4712	5328	2003	1930	8151	2443	3508	4091
	12	3149	3694	-385	1040	5530	1502	2042	2560
11-13	0	116205	114914	211382	67335	213727	66942	128018	126085
	5	29089	29588	43886	15440	49861	16060	27662	28103
	6	22761	23338	32566	11708	38659	12366	20892	21441
	8	14267	14915	17838	6735	23986	7415	12094	12748
	10	9148	9807	9354	3776	15430	4445	7036	7716
	12	5930	6572	4258	1949	10208	2591	4006	4677
12-13	0	59384	56252	99514	34198	104036	32503	64923	61070
	5	14754	14334	15142	7674	24383	7573	13952	13518
	6	11481	11223	9459	5754	18839	5745	10477	10233
	8	7083	7022	2130	3197	11546	3296	5953	5934
	10	4436	4479	-2001	1683	7279	1835	3352	3444
	12	2781	2878	-4390	758	4678	934	1800	1948

Source: Table 24 and 27, Appendix L, and as described in the text.

At a 6 percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $1,861; $6,587; $8,524; $15,597; $25,034; $36,314; and $47,795, respectively.

The marginal private present values at a 6 percent discount rate for grades 8, 9, 10, 11, 12 and 13 at the 6 percent discount rate were found to be $4,726; $1,934; $7,073; $9,437; $11,280; and $11,481, respectively. With the exception of grade 9 the marginal private present values were found to increase as the level of education increased.

At an 8 percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12, and 13 over grade 6 were found to be $1,378; $4,801; $6,126; $10,539; $16,263; $23,448; and $30,530, respectively.

The marginal private present values for grades 8, 9, 10, 11, 12 and 13 at the 8 percent discount rate were found to be $3,423; $1,325; $4,413; $5,724; $7,184; and $7,083, respectively. At an 8 percent discount rate, the marginal present value of grade 13 was found to be lower than the marginal value of grade 12.

At a 10 percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,066; $3,666; $4,589; $7,344; $10,809; $15,522; and $19,958, respectively.

The marginal private present values of grades 8, 9, 10, 11, 12 and 13 at the 10 percent discount rate were found to be \$2,600; \$923; \$2,755; \$3,466; \$4,712; and \$4,436, respectively.

At a 12 percent discount rate, the private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be \$855; \$2,908; \$3,559; \$5,231; \$7,269; \$10,418; and \$13,199, respectively.

The marginal private present values for grades 8, 9, 10, 11, 12 and 13 at 12 percent discount rate were found to be \$2,053; \$651; \$1,672; \$2,038; \$3,149; and \$2,781, respectively. At a 12 percent discount rate, the marginal private present value to 8 years of education was found to be higher than the marginal private returns to 10 and 11 years of education. The highest marginal private return, at a 12 percent discount rate, was for 12 years of education.

Within secondary education, the marginal private present value for grade 9 was found to be the lowest with every discount rate employed in this study. At a discount rate of 8 percent and above, the marginal private return to the 12th year of education was found to be the highest. At discount rates below 8 percent the marginal private returns generally increased as the grade level increased.

(b) Unemployment adjusted private present values. The results of adjusting by unemployment are shown in Table 30, column 4.

At a zero percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $8,383; $25,525; $32,174; 67,138; $114,438; $173,099; and $229,352, respectively. Except at grades 11 and 13, the unemployment adjusted private present values were found to be higher than the unadjusted values.

The marginal unemployment adjusted private present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $17,142; $6,649; $34,965; $47,300; $58,662; and $56,252, respectively. The marginal returns to grades 10 and 12 were found to be higher than the unadjusted ones; the other marginal returns were found to be lower than the unadjusted ones.

At a 5 percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $3,435; $8,760; $11,009; $19,942; $31,925; $47,178; and $61,513, respectively. The adjusted private returns to secondary education at the 5 percent discount rate were found to be higher than the unadjusted returns.

The marginal unemployment adjusted private present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be $5,326; $2,249; $8,932; $11,983; $15,253; and $14,334, respectively. These marginal present values were found to be lower than the unadjusted values except for grade 12.

At a 6 percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $3,003; $7,434; $9,277; $16,256; $25,590; $37,706; and $48,928, respectively. The unemployment adjusted present values were found to be higher than the unadjusted present values.

The marginal unemployment adjusted private present values at a 6 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $4,430; $1,843; $6,979; $9,334; $12,115; and $11,223, respectively. At a 6 percent discount rate, the marginal unemployment adjusted private present values to grade 12 was found to be higher than the unadjusted value.

At an 8 percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,377; $5,572; $6,828; $11,144; $16,887; $24,780; and $31,802, respectively. All of these present values were found to be higher than the unadjusted present values.

The marginal unemployment adjusted private present values at an 8 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $3,195; $1,256; $4,316; $5,743; $7,893; and $7,022, respectively. Except for grades

11 and 12, the adjusted present values were found to be lower than the unadjusted present values.

At a 10 percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,955; $4,370; $5,239; $7,908; $11,464; $16,792; and $21,271, respectively. All these present values were found to be higher than the unadjusted present values.

The marginal unemployment adjusted private present values at a 10 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,415; $869; $2,669; $3,556; $5,328; and $4,479, respectively. The marginal adjusted private present values to grades 11, 12 and 13 were found to be higher than the unadjusted values.

At a 12 percent discount rate, the unemployment adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,657; $3,552; $4,160; $5,764; $7,936; $11,629; and $14,508, respectively. All these present values were found to be higher than the unadjusted values.

The marginal unemployment adjusted private present values at 12 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,896; $609; $1,604; $2,172; $3,694; and $2,878, respectively. The marginal adjusted private present values for grades 8, 9 and 10 were lower than the respective unadjusted values while the rest were found to be higher than the unadjusted values.

The unemployment adjusted private present values of every secondary grade over the elementary level were found to be higher than the unadjusted private values at most discount rates employed in this study, the exceptions are the returns to grades 11 and 13 over grade 6 at a zero percent discount rate. The marginal unemployment adjusted private present values for different grades as compared to the unadjusted ones were found to depend on the levels compared and the discount rates employed. By and large, the marginal present values for lower grades were found to be lower than the unadjusted values while the marginal present values for upper grades were found to be higher than the unadjusted values.

(c) Economic growth adjusted private present values. The private values of adjusting for economic growth are shown in Table 30, column 5.

At a zero percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $10,584; $43,175; $54,254; $117,720; $208,271; $315,110; and $425,900, respectively. All of these present values were found to be higher than the unadjusted present values. The smallest and the largest differences between the adjusted and the unadjusted private present values were for grades 7 and 13, respectively.

The marginal economic growth adjusted private present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $32,591; $11,079; $63,467; $87,634; $100,592; and $99,514, respectively. All of these present values were found to be higher than the unadjusted values.

At a 5 percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $3,253; $11,936; $15,541; $30,732; $51,738; $76,058; and $101,438, respectively. The adjusted private values were found to be higher than the unadjusted values. The lowest difference was found for grade 7 and the highest for grade 13.

The marginal economic growth adjusted private present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be $8,684; $3,605; $15,191; $18,223; $18,507; and $15,142, respectively. These marginal values were found to be higher than the respective unadjusted values.

At a 6 percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $2,682; $9,708; $12,645; $24,437; $40,578; $59,368; and $78,877, respectively. The adjusted private values were found to be higher than the corresponding unadjusted values.

The marginal economic growth adjusted private present values for grades 8, 9, 10, 11, 12 and 13 at a 6 percent discount rate were found to be $7,027; $2,936; $11,793; $13,383; $13,057; and $9,459, respectively. The marginal adjusted value for grade 13 was below the unadjusted value by 18 percent.

At an 8 percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,897; $6,722; $8,703; $15,978; $25,700; $37,279; and $49,117, respectively. These adjusted private present values were found to be higher than the corresponding unadjusted private present values.

The marginal economic growth adjusted private present values for grades 8, 9, 10, 11, 12 and 13 at an 8 percent discount rate were found to be $4,825; $1,982; $7,275; $7,014; $6,018; and $2,130, respectively. While the adjusted marginal present values for grades 8, 9, 10 and 11 were higher than the corresponding unadjusted values, the marginal adjusted values for grades 12 and 13 were below the unadjusted values.

At a 10 percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,409; $4,913;

$6,277; $10,855; $16,807; $24,241; and $31,592, respectively. These adjusted present values were found to be higher than the corresponding unadjusted private present values.

The marginal economic growth adjusted private present values for grades 8, 9, 10, 11, 12 and 13 at a 10 percent discount rate, were found to be $3,504; $1,364; $4,578; $3,291; $2,003; and -$2,001, respectively. While the adjusted marginal present values for grades 8, 9 and 10 were higher than the corresponding unadjusted values, the marginal adjusted values for grades 11 and 12 were lower than the unadjusted values. On the other hand, the adjusted marginal present value of grade 13 was found to be negative $2,001.

At a 12 percent discount rate, the economic growth adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,091; $3,757; $4,713; $7,600; $11,243; $16,149; and $20,792, respectively. These adjusted present values were found to be higher than the corresponding unadjusted private present values.

The marginal economic growth adjusted private present values for grades 8, 9, 10, 11, 12 and 13 were found to be $2,666; $955; $2,887; $1,028; -$385; and -$4,390, respectively. The adjusted marginal private present values for grades 8, 9, 10 and 11 were higher than the corresponding unadjusted values. On the other hand, the adjusted marginal private present values of grades 12 and 13 were negative $385 and $4,390, respectively.

The economic growth adjusted private present values of secondary education over primary were found to be higher than the unadjusted present values at every discount rate employed in this study. However, this was not reflected in all of the marginal values. For example, the marginal economic growth adjusted private present values of grades 11, 12 and 13 were found to be lower than the unadjusted present values at and beyond 10, 8, and 6 percent discount rates, respectively. The marginal adjusted present values of grades 12 and 13 were negative at and beyond 12 and 10 percent discount rates, respectively.

(d) Alpha Coefficient adjusted private present values. The alpha adjusted results are shown in Table 30, column 6.

At a zero percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $3,754; $14,631; $18,746; $38,607; $67,061; $100,281; and $135,039, respectively. These adjusted present values were below the respective unadjusted present values by about 40 percent.

The marginal alpha adjusted private present values at a zero percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $10,877; $4,116; $19,738; $28,220; $32,899; and $34,198, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 5 percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,283; $4,647; $6,024; $10,600; $17,117; $24,965; and $33,100, respectively. These adjusted present values were below the respective unadjusted present values.

The marginal alpha adjusted private present values at a 5 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $3,364; $1,377; $4,460; $6,304; $7,570; and $7,674, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 6 percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $1,078; $3,875; $4,998; $8,419; $13,305; $19,341; and $25,539, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted private present values at a 6 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,797; $1,123; $3,305; $4,678; $5,766; and $5,754, respectively. All the adjusted marginal present values were below the unadjusted values.

At an 8 percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $788; $2,803; $3,559; $5,400; $8,087; $11,705; and $15,314, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted private values at an 8 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $2,015; $756; $1,729; $2,486; $3,363; and $3,197, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 10 percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $601; $2,122; $2,637; $3,497; $4,856; $7,028; and $9,094, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted private present values at a 10 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,521; $515; $749; $1,165; $1,930; and $1,683, respectively. All the adjusted marginal present values were below the unadjusted values.

At a 12 percent discount rate, the alpha adjusted private present values for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be $474; $1,667; $2,019; $2,244; $2,771; $4,040; and $5,154, respectively. These adjusted present values were below the unadjusted present values.

The marginal alpha adjusted private present values at a 12 percent discount rate for grades 8, 9, 10, 11, 12 and 13 were found to be $1,193; $352; $115; $341; $1,040; and $758, respectively. All the adjusted marginal present values were below the unadjusted values.

The 60 percent alpha adjusted private present values of secondary education over primary were found to be about 60 percent of the unadjusted present values at a zero percent discount rate, the magnitude decreasing as the discount rates increased.

(e) Other adjustments. The private present values adjusted by (1) economic growth and unemployment (2) unemployment and alpha, (3) economic growth and alpha, and (4) economic growth, alpha and unemployment are shown in Table 30, columns 7, 8, 9 and 10, respectively.

At a zero percent discount rate, the private present values for grades 7 to 13 over grade 6 were found to be the highest when data were adjusted by economic growth and unemployment, followed by the values adjusted either by economic growth, alpha and unemployment, or economic growth and alpha; and unemployment and alpha, in that order. The unadjusted private present values for grades 7 to 13 were found to be higher than the values adjusted by unemployment and alpha.

The marginal private present values for grades 8, 9, 10, 11, 12 and 13 at a zero percent discount rate were found to be the highest when data were adjusted by economic growth and unemployment, and the lowest present values were found when data were adjusted by unemployment and alpha. The marginal private present values adjusted by economic growth and alpha, and economic growth, alpha and unemployment fell between the two extremes. The marginal unadjusted private present values were found to be higher than the values adjusted by unemployment and alpha.

At a 5 percent discount rate, the private present values for grades 7 to 13 over grade 6 were found to be the highest when data were adjusted by economic growth and unemployment, followed by the values adjusted by economic growth, alpha and unemplcyment; economic growth and alpha; and unemployment and alpha, in that order. The unadjusted private present values for grades 7 to 13 were found to be higher than the values adjusted by economic growth and alpha; economic growth, alpha and unemployment; and unemployment and alpha.

The marginal private present values for grades 8, 9, 10, 11, 12 and 13 at a 5 percent discount rate were found to be the highest when data were adjusted by economic growth and unemployment, and the lowest present values were found when data were adjusted by unemployment and alpha. The marginal private present values adjusted by economic growth and alpha; and economic growth, alpha and unemployment fell between the two extremes. The marginal unadjusted private present values were found to be higher than the values adjusted by economic growth and alpha; economic growth, alpha and unemployment; and unemployment and alpha.

The relative magnitudes of the private present values for grades 7 to 13 over grade 6 and the marginal private present values for grades 8, 9, 10, 11, 12 and 13 described under the 5 percent discount rate also apply to the values found at 6, 8, 10 and 12 percent discount rates.

Summary

The private present values for grades 7 to 13 over grade 6 were found to be the highest when earnings were adjusted by economic growth and unemployment, followed, in descending order, by the values adjusted by economic growth; unemployment; unadjusted; economic growth, alpha and unemployment; economic growth and alpha; unemployment and alpha; and alpha at most discount rates employed in this study.

The marginal private present values for grades 8, 9 and 10 were found to be the highest when earnings were adjusted by economic growth, followed, in descending order, by the values adjusted by economic growth and unemployment; unadjusted; unemployment; economic growth and and alpha, or economic growth, alpha and unemployment; unemployment and alpha, or alpha at most discount rates beyond zero percent. The adjusted and unadjusted relative magnitudes of the marginal private present values for grades 11, 12 and 13 were found to vary with the discount rates employed. This variation was primarily due to the influence of economic growth on marginal values. For example, while the economic growth adjusted marginal private present values for grade 13 was found to be the second highest at zero and 5 percent discount rates, the value was found to be the sixth highest at 6 percent discount rate, and the lowest at 8 and beyond discount rates.

Sub-Problem 3: Social and Private Internal Rates-of-Return

The marginal and average social and private internal rates-of-return were computed for secondary education. The results are discussed below.

Sub-Problem 3a: What are the social internal rates-of-return of the marginal earnings streams of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

(a) Unadjusted social rates-of-return. The findings are presented in Table 31 which shows the grade levels and age of the average student along with the rates-of-return.

The social internal rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 16.6, 24.3, 19.6, 17.4, 16.9, 18.0, and 18.3 percent, respectively. The highest average return was found for grade 8 over grade 6 follwed by grade 9 over grade 6. The marginal internal

Table 31

Unadjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To		From							
Age		Age	11	12	13	14	15	16	17
	Grade	Grade	6	7	8	9	10	11	12
12	7	Social	16.6						
		Private	107.5						
13	8	Social	24.3	30.8					
		Private	151.8	196.9					
14	9	Social	19.6	20.6	12.8				
		Private	106.2	105.5	31.2				
15	10	Social	17.4	17.5	14.9	15.7			
		Private	29.2	26.2	19.5	18.2			
16	11	Social	16.9	17.0	15.5	16.0	16.2		
		Private	23.9	22.3	18.9	18.2	18.2		
17	12	Social	18.0	18.1	17.1	17.6	18.6	21.8	
		Private	24.3	23.1	20.5	20.1	21.2	25.3	
18	13	Social	18.3	18.3	17.6	18.0	18.8	20.5	19.3
		Private	23.7	22.7	20.8	20.5	21.3	23.3	21.5

Source: Tables 24, 25 and 27

Note: In Tables 31 through 38, the average rates-of-return are read downward while the marginal rates-of-return over the previous years of schooling are read diagonally.

rates-of-return at the secondary level for grades 8 , 9, 10, 11, 12 and 13 were found to be 30.8, 12.8, 15.7, 16.2, 21.8, and 19.3 percent, respectively. As shown in Table 31, the highest marginal return was obtained for grade 8 follwed by grade 12. The lowest marginal return was found for grade 9.

(b) Unemployment adjusted social internal rates-of-return. The results are shown in Table 32.

The unemployment adjusted social internal rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 35.3, 31.3, 23.2, 18.8, 18.2, 19.7, and 19.8 percent, respectively. The unemployment adjusted internal rate-of-return of grade 7 over grade 6 was found to be 35.3 percent which was more than twice the unadjusted rate of 16.6 percent. The adjusted returns for grades 8 over grade 6, and grade 9 over grade 6 were found to be higher than the unadjusted rates-of-return. The adjusted rates-of-return for grades 10 and above over grade 6 were found to be only slightly higher than the unadjusted rates-of-return. The unemployment adjusted marginal social rates-of-return for grades 8, 9, 10, 11, 12 and 13 were found to be 28.1, 12.4, 15.5, 17.0, 25.5, and 20.5 percent, respectively. The adjusted marginal returns to grades 8, 9 and 10 were found to be slightly lower than the unadjusted rates-of-return. The adjusted marginal returns to grades 11, 12 and 13 were found to be slightly higher than the unadjusted returns.

(c) Economic growth adjusted social internal rates-of-

Table 32

Unemployment Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To		From							
Age	Grade	Age	11	12	13	14	15	16	17
		Grade	6	7	8	9	10	11	12
12	7	Social	35.3						
		Private	'a'						
13	8	Social	31.3	28.1					
		Private	'a'	172.0					
14	9	Social	23.2	19.4	12.4				
		Private	142.6	91.3	29.5				
15	10	Social	18.8	17.0	14.7	15.5			
		Private	34.3	25.6	19.4	18.2			
16	11	Social	18.2	17.0	15.7	16.3	17.0		
		Private	27.2	22.8	19.4	18.8	19.5		
17	12	Social	19.7	18.8	18.0	18.7	20.5	25.5	
		Private	28.0	24.6	22.1	21.7	23.9	30.3	
18	13	Social	19.8	19.1	18.5	19.1	20.5	22.8	20.5
		Private	26.9	24.3	22.3	22.0	23.6	26.5	23.1

Source: Tables 24, 25 and 27, and Appendix C.

Note: 'a' denotes internal rates-of-return over 200 percent.

return. The results are shown in Table 33.

The economic growth adjusted social rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 19.0, 26.8, 21.9, 19.7, 19.3, 20.4, and 20.6 percent, respectivley. These rates were all found to be about 2.4 percentage points higher than the unadjusted rates. The economic growth adjusted marginal rates for grades 8, 9, 10, 11, 12 and 13 were found to be 33.5, 15.0, 18,0, 11.4, 10.0, and 7.8 percent, respectively. The adjusted marginal rates for grades 8, 9 and 10 were found to be higher than the unadjusted rates while the adjusted marginal rates for grades 11, 12 and 13 were found to be lower than the unadjusted rates.

(d) Alpha coefficient adjusted social internal rates-of-return. The results are shown in Table 34.

The alpha adjusted social internal rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 10.4, 15.8, 13.4, 12.1, 12.1; 12.9; and 13.3 percent, respectively. The alpha adjusted rates were found to be substantially lower than the unadjusted rates. The alpha adjusted social marginal internal rates-of-return for grades 8, 9, 10, 11, 12 and 13 were found to be 20.2, 9.5, 10.6, 11.7, 14.4, and 13.3 percent, respectively. These alpha adjusted marginal rates were found to be lower than the unadjusted rates by 10.6, 3.3, 5.1, 4.5, 7.4, and 6 percentage points, respectively.

Table 33

Economic Growth Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To Age	To Grade	From Age	11	12	13	14	15	16	17
		From Grade	6	7	8	9	10	11	12
12	7	Social	19.0						
		Private	117.7						
13	8	Social	26.8	33.5					
		Private	156.8	'a'					
14	9	Social	21.9	23.0	15.0				
		Private	110.3	109.6	33.9				
15	10	Social	19.7	19.8	17.2	18.0			
		Private	31.8	28.7	21.9	20.6			
16	11	Social	19.3	19.3	17.8	18.3	11.4		
		Private	26.4	24.8	21.3	20.6	13.3		
17	12	Social	20.4	20.4	19.4	19.9	14.9	10.0	
		Private	26.8	25.6	23.0	22.5	17.3	11.6	
18	13	Social	20.6	20.7	19.9	20.3	16.4	13.1	7.8
		Private	26.1	25.2	23.2	22.9	18.9	15.0	8.9

Source: Tables 24, 25 and 27

Note: 'a' indicates rate over 200%

Table 34

Alpha Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To Age	Grade	From Age	11	12	13	14	15	16	17
		Grade	6	7	8	9	10	11	12
12	7	Social	10.4						
		Private	65.7						
13	8	Social	15.8	20.2					
		Private	91.5	118.1					
14	9	Social	13.4	14.5	9.5				
		Private	64.8	64.3	24.9				
15	10	Social	12.1	12.2	10.4	10.6			
		Private	20.0	18.2	13.7	12.5			
16	11	Social	12.1	12.2	11.1	11.3	11.7		
		Private	17.1	16.1	13.6	13.0	13.2		
17	12	Social	12.9	12.9	12.2	12.4	13.0	14.4	
		Private	17.4	16.6	14.7	14.3	14.8	16.6	
18	13	Social	13.3	13.3	12.7	12.9	13.4	14.1	13.3
		Private	17.3	16.6	15.1	14.8	15.2	16.1	14.9

Source: Tables 24, 25 and 27

(e) Alpha coefficient and unemployment adjusted social internal rates-of-return. The results are shown in Table 35.

The alpha and unemployment adjusted social rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 20.2, 19.4, 15.2, 13.1, 13.1, 14.2, and 14.5 percent, respectively. Except the rate for grade 7 over grade 6, the adjusted social rates for other grades were found to be lower than the unadjusted rates. The adjusted marginal rates-of-return for grades 8, 9, 10, 11, 12 and 13 were found to be 18.8, 9.2, 10.9, 12.4, 16.7, and 14.1 percent, respectively. These rates were found to be lower than the unadjusted rates by 12.0, 3.6, 4.8, 3.8, 5.1 and 5.2 percentage points, respectively.

(f) Economic growth and unemployment adjusted social internal rates-of-return. The results are shown in Table 36.

The economic growth and unemployment adjusted rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 were found to be 38.0, 33.9, 25.7, 21.2, 20.5, 22.1, and 22.2 percent, respectively. These rates were found to be higher than the unadjusted rates by 21.4, 9.6, 6.1, 3.8, 3.6, 4.1, and 3.9 percentage points, respectively. The adjusted marginal social rates for grades 8, 9, 10, 11, 12 and 13 were found to be 30.7, 14.6, 17.8, 19.4, 28.0, and 22.9, respectively. The adjusted marginal rate for grade 8 was almost the same as the unadjusted rate. However, the other adjusted marginal rates were found to be higher than the unadjusted rates by

Table 35

Alpha and Unemployment Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To		From							
Age		Age	11	12	13	14	15	16	17
	Grade	Grade	6	7	8	9	10	11	12
12	7	Social	20.2						
		Private	147.8						
13	8	Social	19.4	18.8					
		Private	125.6	103.3					
14	9	Social	15.2	13.7	9.2				
		Private	86.0	56.5	23.8				
15	10	Social	13.1	12.1	10.5	10.9			
		Private	23.4	18.3	14.0	12.8			
16	11	Social	13.1	12.3	11.4	11.7	12.4		
		Private	19.5	16.6	14.2	13.7	14.2		
17	12	Social	14.2	13.6	12.9	13.3	14.4	16.7	
		Private	20.2	17.8	15.9	15.6	16.8	19.7	
18	13	Social	14.5	14.0	13.4	13.8	14.6	15.7	14.1
		Private	19.8	17.8	16.3	16.0	16.9	18.3	16.0

Source: Tables 24, 25 and 27, and Appendix C.

Table 36

Unemployment and Economic Growth Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To Age	To Grade	From Age Grade	11 6	12 7	13 8	14 9	15 10	16 11	17 12
12	7	Social	38.0						
		Private	'a'						
13	8	Social	33.9	30.7					
		Private	'a'	177.4					
14	9	Social	25.7	21.8	14.6				
		Private	147.5	95.1	32.0				
15	10	Social	21.2	19.3	17.0	17.8			
		Private	37.0	28.1	21.8	20.5			
16	11	Social	20.5	19.3	18.0	18.6	19.4		
		Private	29.8	25.3	21.8	21.2	21.9		
17	12	Social	22.1	21.2	20.3	21.0	22.9	28.0	
		Private	30.6	27.1	24.5	24.2	26.4	32.9	
18	13	Social	22.2	21.5	20.9	21.5	22.9	25.3	22.9
		Private	29.4	26.8	24.7	24.5	26.1	29.0	25.5

Source: Tables 24, 25 and 27, and Appendix C.

Note: 'a' indicates rate over 200%

1.8, 2.1, 3.2, 6.2, and 3.6 percentage points, respectively.

(g) Alpha and economic growth adjusted social internal rates-of-return. The results are shown in Table 37.

The alpha and economic growth adjusted social rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 12.6, 18.1, 15.6, 14.3, 14.4, 15.2, and 15.5 percent, respectively. These rates were found to be lower than the unadjusted rates by 4.0, 6.2, 4.0, 3.1, 2.5, 2.8, and 2.8 percentage points, respectively. Moreover, the adjusted marginal rates for grades 8, 9, 10, 11, 12 and 13 were found to be 22.6, 11.7, 12.9, 13.9, 16.7, and 15.6 percent, respectively. These marginal rates were found to be lower than the unadjusted rates by 8.2, 1.1, 1.2, 2.3, 5.1 and 3.7 percentage points, respectively.

(h) Alpha, economic growth and unemployment adjusted social internal rates-of-return. The results are shown in Table 38.

The alpha, economic growth and unemployment adjusted social rates-of return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 22.6, 21.7, 17.5, 15.3, 15.3, 16.4, and 16.8 percent, respectively. The adjusted rate-of-return for grade 7 over grade 6 was found to be higher than the unadjusted rate by 6 percentage points. On the other hand, the adjusted rates of grades 8 to 13 over grade 6 were found to be lower than the unadjusted rates by 2.6, 2.1,

Table 37

Alpha and Economic Growth Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To Age	To Grade	From Age	11	12	13	14	15	16	17
		Grade	6	7	8	9	10	11	12
12	7	Social	12.6						
		Private	69.0						
13	8	Social	18.1	22.6					
		Private	95.3	122.5					
14	9	Social	15.6	16.8	11.7				
		Private	68.1	67.6	27.4				
15	10	Social	14.3	14.4	12.6	12.9			
		Private	22.4	20.5	16.0	14.7			
16	11	Social	14.4	14.4	13.3	13.5	13.9		
		Private	19.5	18.4	15.9	15.3	15.5		
17	12	Social	15.2	15.2	14.4	14.7	15.2	16.7	
		Private	19.8	18.9	17.0	16.6	17.1	18.9	
18	13	Social	15.5	15.6	14.9	15.2	15.6	16.4	15.6
		Private	19.6	18.9	17.4	17.1	17.5	18.4	17.2

Source: Tables 24, 25 and 27

Table 38

Alpha, Economic and Unemployment Adjusted Social and Private Internal Rates-of-Return; Bahamas Males: 1970

To Age	Grade	From Age	11	12	13	14	15	16	17
		Grade	6	7	8	9	10	11	12
12	7	Social	22.6						
		Private	152.8						
13	8	Social	21.7	21.2					
		Private	130.1	107.4					
14	9	Social	17.5	16.0	11.3				
		Private	89.7	59.7	26.3				
15	10	Social	15.3	14.3	12.7	13.1			
		Private	25.9	20.6	16.3	15.1			
16	11	Social	15.3	14.6	13.6	14.0	14.6		
		Private	21.9	19.0	16.5	15.9	16.5		
17	12	Social	16.4	15.8	15.6	15.6	16.7	19.0	
		Private	22.6	20.2	18.2	17.9	19.1	22.1	
18	13	Social	16.8	16.2	15.7	16.0	16.9	18.1	16.4
		Private	22.2	20.2	18.6	18.3	19.3	20.7	18.3

Source: Tables 24, 25 and 27, and Appendix C.

2.1, 1.6, 1.6, and 1.5 percentage points, respectively. The adjusted marginal rates for grades 8, 9, 10, 11, 12 and 13 were found to be 21.2, 11.3, 13.1, 14.6, 19.0 and 16.4 percent, respectively. These adjusted marginal rates were found to be lower than the unadjusted rates by 9.6, 1.5, 2.6, 1.6, 2.8 and 2.9 percentage points, respectively.

Summary

The adjusted and unadjusted social internal rates-of-return on secondary education for grades 7 to 13 over grade 6 and the marginal rates-of-return at the secondary level, the results of which are shown in Tables 31 to 38, indicate that the different adjustments employed in this study have different effects on the rates-of-return. The highest social rate-of-return of 38 percent to grade 7 over grade 6 was found when data were adjusted by unemployment and economic growth. This was followed, in descending order, by unemployment adjusted; unemployment, alpha, and economic growth adjusted; unemployment and alpha adjusted; economic growth adjusted; unadjusted; alpha and economic growth adjusted; and alpha adjusted rates. The social rates-of-return for grade 7 over grade 6 varied from a low of 10.4 (alpha adjusted) to a high of 38 percent (unemployment and economic growth).

Furthermore, the social internal rates-of-return for grades 8 to 13 over grade 6 were found to be the highest when data were adjusted by economic growth and unemployment.

The highest rate of 33.9 percent was found for grade 8 over grade 6, followed by 25.7 percent for grade 9 over grade 6; 21.2 percent for grade 10 over grade 6; 20.5 percent for grade 11 over grade 6; 22.1 percent for grade 12 over grade 6; and 22.2 percent for grade 13 over grade 6.

The rates adjusted by unemployment or economic growth separately were found to be the second highest, the position of the two adjustments varying with the levels considered. For example, the rates adjusted by unemployment were found to be higher than the rates adjusted by economic growth for grades 8 and 9 over grade 6, whereas the rates adjusted by economic growth were found to be higher than the rates adjusted by unemployment for grades 10 to 13 over grade 6.

The social rates-of-return for grades 8 to 13 over grade 6 adjusted by economic growth, alpha coefficient and unemployment; alpha coefficient and economic growth; alpha coefficient and unemployment; and alpha coefficient were found to be lower than the unadjusted social rates. Of the latter four adjustments, the highest rates were found when the data were adjusted by economic growth, alpha and unemployment, followed, in descending order, by rates found when data were adjusted by alpha and economic growth; alpha and unemployment; and alpha coefficient.

The highest marginal social rate-of-return for grade 8 of 33.5 percent was found when data were adjusted by economic growth, followed by unadjusted rate of 30.8

percent. The lowest marginal rate-of-return of 18.8 percent for grade 8 was found when data were adjusted by alpha and economic growth. The marginal social rates-of-return for grades 9 and 10 were the highest when data were adjusted by economic growth and unemployment, and the lowest marginal rates-of-return were found when data were adjusted by either alpha and unemployment or alpha. Furthermore, the social marginal internal rates-of-return for grades 11, 12 and 13 were found to be the highest when data were adjusted by economic growth and unemployment, followed by rates adjusted by unemployment. The lowest marginal social rates-of-return for grades 11, 12 and 13 were found when data were adjusted by economic growth.

Sub Problem 3b: What are the private internal rates-of-return of the marginal earnings streams of the Bahamas male labor force with different amounts of secondary education compared to elementary education and among different grades at the secondary level?

The results of the marginal and average private internal rates-of-return are presented below under each adjustment.

(a) Unadjusted private internal rates-of-return. The results are shown in Table 31.

The private rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 107.5, 151.8, 106.2, 29.2, 23.9, 24.3, and 23.7 percent, respectively. The marginal rates for grades 8, 9, 10, 11, 12 and 13 were found to be 196.9, 31.2, 18.2, 18.2, 25.3, and 21.5 percent, respectively. The marginal return to grade 8 was found to be the highest, followed by grade 9 and grade 12, in that order.

(b) Unemployment adjusted private internal rates-of-return. The results are shown in Table 32.

The unemployment adjusted private internal rates-of-return for grades 7 and 8 over grade 6 were found to be over 200 percent and thus the exact figures were not recorded in Table 32. The other rates-of-return for grades 9, 10, 11, 12 and 13 over grade 6 were found to be 142.6, 34.3, 27.2, 28.0, and 26.9 percent, respectively. These later rates were found to be higher than the unadjusted rates by 36.4, 5.1, 3.3, 3.7; and 3.2 percentage points, respectively. Furthermore, the marginal rates for grades 8, 9, 10, 11, 12 and 13 were found to be 172.0, 29.5, 18.8, 19.5, 30.3, and 23.1 percent, respectively. The adjusted marginal rate for grade 10 was found to be almost the same as the unadjusted rate. On the other hand, the adjusted marginal rates of grades 8 and 9 were found to be less than the unadjusted rates by 24.9 and 1.7 percentage points, respectively. The other adjusted marginal rates for grades 11, 12 and 13 were found to be higher than the unadjusted rates by 1.3, 5.0, and 1.6 percentage points, respectively.

(c) Economic growth adjusted private internal rates-of-return. The results are shown in Table 33.

The economic growth adjusted rates for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 111.7, 156.8, 110.3, 31.8, 26.4, 26.8, and 26.1 percent, respectively. These rates were found to be higher than the unadjusted rates by 4.2, 5.0, 4.1, 2.6, 2.5, 2.5, and 2.4 percentage points, respectively. The adjusted marginal rate for grade 8 was found to be over 200 percent and thus the figure was not recorded as shown in Table 33. The other adjusted marginal rates for grades 9, 10, 11, 12 and 13 were found to be 33.9, 20.6, 13.3, 11.6, and 8.9 percent, respectively. The marginal rates for grades 9 and 10 were found to be higher than the unadjusted rates by 2.7, and 2.4 percentage points, respectively. The adjusted marginal rates for grades 11, 12 and 13 were found to be lower than the unadjusted rates by 4.9, 13.7, and 12.6 percentage points, respectively.

(d) Alpha coefficient adjusted private internal rates-of-return. The results are shown in Table 34.

The alpha adjusted private internal rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 65.7, 91.5, 64.8, 20.0, 17.1, 17.4 and 17.3 percent, respectively. These rates were found to be lower than the unadjusted rates by about 6 to 60 percentage points.

Furthermore, the marginal adjusted private rates for grades 8, 9, 10, 11, 12 and 13 were found to be 118.1, 24.9, 12.5, 13.2, 16.6, and 14.9 percent, respectively. These rates were found to be lower than the unadjusted rates by about 5 to 79 percentage points. In all cases, the alpha adjusted private internal rates-of-return were found to be lower than the unadjusted rates.

(e) Alpha coefficient and unemployment adjusted private internal rates-of-return. The results are shown in Table 35.

The alpha and unemployment adjusted private rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 147.9, 125.6, 86.0, 23.4, 19.5, 20.2, and 19.8 percent, respectively. Except for the rate for grade 7 over grade 6 which was found to be higher than the unadjusted rate by 40.3 percentage points, the other adjusted rates were found to be lower than the unadjusted rates by 26.2, 20.2, 5.8, 4.4, 4.1, and 3.9 percentage points, respcectively. The adjusted marginal private rates for grades 8, 9, 10, 11, 12 and 13 were found to be 103.3, 23.8, 12.8, 14.2, 19.7, and 16.0 percent, respectively. These rates were found to be lower than the unadjusted rates by 93.6, 7.4, 5.4, 4.0, 5.6, and 5.5 percentage points, respectively.

(f) Economic growth and unemployment adjusted private internal rates-of-return. The results are shown in Table 36.

The economic growth and unemployment adjusted private rates-of-return for grades 7 and 8 over grade 6 were found to be over 200 percent, thus they are not recorded in Table 36. The other adjusted rates for grades 9, 10, 11, 12 and 13 over grade 6 were found to be 147.5, 37.0, 29.8, 30.6, and 29.4 percent, respectively. These rates were found to be higher than the unadjusted rates by 41.3, 7.8, 5.9 6.3, and 5.7 percentage points, respectively. Furthermore, the adjusted marginal private rates for grades 8, 9, 10, 11, 12 and 13 were found to be 177.4, 32.0, 20.5, 21.9, 32.9, and 25.5 percent, respectively. Except for the marginal rate for grade 8 which was found to be lower than the unadjusted rate by 19.5 percentage points, the other marginal rates were found to be higher than the unadjusted rates by 0.8, 2.3, 3.7, 7.6 and 4.0 percentage points, respectively.

(g) Alpha and economic growth adjusted private internal rates-of-return. The results are shown in Table 37.

The alpha and economic growth adjusted private rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 69.0, 95.3, 68.1, 22.4, 19.5, 19.8, and 19.6 percent, respectively. These rates were found to be lower than the unadjusted rates by 38.5, 56.5, 38.1, 6.8, 4.4, 4.5, and 4.1 percentage points, respectively. Furthermore, the adjusted marginal private rates for grades 8, 9, 10, 11, 12 and 13 were found to be 122.5, 27.4, 14.7, 15.5, 18.9, and 17.2 percent, respectively. These rates were found to be lower than the unadjusted rates by 74.4, 3.8, 3.5, 2.7, 6.4, and 4.3 percentage points, respectively.

(h) Alpha, economic growth and unemployment adjusted private internal rates-of-return. The results are shown in Table 38.

The alpha, economic growth and unemployment adjusted private rates-of-return for grades 7, 8, 9, 10, 11, 12 and 13 over grade 6 were found to be 152.8, 130.1, 89.7, 25.9, 21.9, 22.6, and 22.2 percent, respectively. Except for the rate for grade 7 over grade 6 which was found to be higher than the unadjusted rate, the other adjusted rates were found to be lower than the unadjusted rates by 21.7, 16.5, 3.3, 2.0, 1.7, and 1.5 percentage points, respectively. Furthermore, the adjusted marginal private rates for grades 8, 9, 10, 11, 12 and 13 were found to be 107.4, 26.3, 15.1, 16.5, 22.1, and 18.3 percent, respectively. These marginal rates were found to be lower than the unadjusted rates by 89.5, 4.9, 3.1, 1.7, 3.2, and 3.2 percentage points, respectively.

Summary

The adjusted and unadjusted private internal rates-of-return on secondary education for grades 7 to 13 over grade 6 and the marginal rates-of-return at the secondary level, the results of which are shown in Tables 31 to 38, indicate that the different adjustments employed in this study have different effects on the rates-of-return. The highest private rates-of-return of over 200 percent to grades 7 and 8 over grade 6 were found when earnings data were adjusted either by unemployment or economic growth and unemployment. The adjusted rates for grade 7 over grade 6 were found to be higher than the unadjusted rates except for the rates adjusted by alpha, and alpha and economic growth. In all, the adjusted and unadjusted private rates-of-return for grade 7 over grade 6 varied from 66 to over 200 percent, the highest rate being when data were adjusted by either unemployment or economic growth and unemployment, followed, in descending order, by alpha, economic growth and unemployment adjusted; alpha and unemployment adjusted; economic growth adjusted; unadjusted; alpha and economic growth adjusted; and alpha adjusted.

Furthermore, the private internal rates-of-return for grades 9 to 13 over grade 6 were found to be highest when data were adjusted by economic growth and unemployment. The highest rate of 147.5 percent was found for grade 9 over grade 6, followed by 37.0 percent for grade 10 over grade 6; 29.8 percent for grade 11 over grade 6; 30.6 percent for grade 12 over grade 6; and 29.4 percent for grade 13 over grade 6 when data were adjusted by economic growth and unemployment. The rates adjusted by unemployment were found to be the second highest, followed, in descending order, by economic growth adjusted; unadjusted; alpha, economic growth and unemployment adjusted; alpha and unemployment adjusted;

alpha and economic growth adjusted; and alpha adjusted.

The highest marginal private rate-of-return for grade 8 of over 200 percent was found when data were adjusted by economic growth, followed by unadjusted rate of 196.9 percent. The lowest marginal rate-of-return of 103.3 percent for grade 8 was found when data were adjusted by alpha and economic growth. The marginal private rates-of-return for grades 9 and 10 were the highest when data were adjusted by economic growth, followed by the rates adjusted by economic growth and unemployment. The lowest marginal rates-of-return were found when data were adjusted by either alpha and unemployment or alpha. Furthermore, the private marginal internal rates-of-return for grades 11, 12 and 13 were found to be the highest when data were adjusted by economic growth and unemployment, followed by rates adjusted by unemployment. The lowest marginal private rates-of-return for grades 11, 12 and 13 were found when data were adjusted by economic growth.

The social and private costs and benefits of secondary education of the Bahamas male labor force analyzed above under different assumptions are discussed further in the next chapter. The discussion brings out the important aspects of the findings and compares the results of this study with similar studies made in other countries.

CHAPTER VII

DISCUSSION OF RESULTS

The analysis of costs and benefits presented in Chapter VI are discussed in this chapter.

The social and private direct and indirect costs, which were identified earlier under sub-problem 1, were compared with the mean annual earnings differentials in the male labor force to evaluate the investment returns on secondary education. Private and social direct costs of $97.0 and $666.0 per year, respectively, were considered as the only investment cost of grades 7, 8 and 9, while the investment of grades 10 and beyond included both the direct and indirect costs.

Two basic analyses, namely present values and internal rates-of-return, were employed to evaluate the social and private investment on different amounts of secondary education. The two analyses were applied for different categories of adjustments of costs and benefits to test the sensitivities of the benefits of education to the various assumptions. Moreover, six discount rates, i.e. 0, 5, 6, 8, 10 and 12 percent, were employed in the determination of the social and private present values. These discount rates provided a range of present values of both social and private marginal lifetime earnings for different levels of secondary education.

In this section the findings reported earlier, are synthesized. The social and private present values and internal rates-of-return are compared to show the overall findings. The findings of internal rates-of-return are also compared with findings in other studies.

SOCIAL AND PRIVATE INTERNAL RATES-OF-RETURN

The rates-of-return obtained by using the unadjusted costs and earnings differentials in the Bahamas male labor force shown in Tables 24, 25, and 27 indicated that the investments on every grade in the secondary education after primary were profitable both for the individual students and the society at large. While the unadjusted social internal rates-of-return varied from a minimum of 16.6 percent to a maximum of 24.3 percent, the private rates varied from a minimum of 23.7 percent to a maximum of 151.8 percent on the investments on secondary education over 6 years of education. The marginal social internal rates-of-return at the secondary level varied from a minimum of 12.8 percent to a maximum of 30.8 percent. Similarly, the marginal private internal rates-of-return varied from a minimum of 18.2 percent to a maximum of 196.9 percent.

The decision as to whether or not to invest in furthur education at the secondary level can depend both on the average returns on a block of education or on the marginal returns on each extra grade. But the unadjusted marginal returns which may be appropriate measure for capital investment show that 8 years over 7 years of education is the most profitable both for individual investors and society. The private and social rates-of-return are 196.9 and 30.8 percent, respectively. Furthermore, the next highest marginal rate-of-return, on private investment was found to be 7 years over 6 years, followed by 9 years over 8 years with the internal rates-of-return of 107.5 and 31.2 percent, respectively. The lowest private return of 18.2 percent was found to be on the investment on 10 years over 9 years, and 11 years over 10 years of education. Moreover, the second highest rate-of-return on the social investment was found to be 12 years over 11 years, followed by 13 years over 12 years with the internal rates-of-return of 21.8 and 19.3 percent, respectively. The lowest unadjusted social rate-of-return of 12.8 percent was found to be on 9 years over 8 years of education.

The results obtained reflected the influence of the social and private direct cost estimates. While the direct social costs at grades 7, 8 and 9 were found to be almost seven times the private costs for the same level, the private internal rates-of-return were found to be almost six times the social internal rates-of-return. The inclusion of the indirect costs at grade 10 and over reduced the difference between the social and private internal rates-of-return at the upper secondary level.

Based on the unadjusted internal rates-of-return the private investment on each of the lower secondary grades (grades 7, 8, and 9) over grade 6 was found to yield more than 100 percent. On the other hand, the average private rate-of-return to 13 years of education over 9 years was found to be 20.5 percent. Thus, even though the marginal returns decline at the higher grade levels, secondary education is still likely to be a profitable private investment.

Turning to the social internal rates-of-return, one observes that the unadjusted social investment on secondary education also appears to be profitable. The average yield on the first three secondary grades was found to be 19.6 percent, whereas the average yield on the upper four grades was found to be 18.0 percent. From the standpoint of society, the private and social internal rates-of-return provide a number of policy alternatives:

(a) The very high private returns to the lower secondary education will attract individual demand for this level of education. Thus the society might require students to bear more of the direct costs and be in a position to reallocate resources to expand the upper secondary level. The differences between private and social internal rates-of-return at the upper secondary is too small to allow a flexible policy on resource allocation.

(b) The social rates-of-return on secondary education in the Bahamas might be used to establish the value of investing in education rather than other forms of public expenditure. There is no bench-mark of social rate-of-return to use as a comparison. If the social rates-of-return on other forms of public investment are below 18 percent, (see Table 31), then secondary education can justifiably be expanded.

When the earnings differentials were adjusted to account for other income-related factors, the social and private rates-of-return changed. The rates-of-return were tested for their sensitivity to the influences of the prevailing unemployment rates, per capita economic growth rate and alpha coefficient. The results adjusted by the three factors separately and in different combinations are shown in Tables 31 through 38.

The alpha adjusted internal rates-of-return on secondary education were found to be lower than the unadjusted rates in all cases. The economic growth and unemployment adjusted social and private rates-of-return on the investment in secondary education over 6 years were found to be higher than the unadjusted returns. For example, the social rate-of-return on the investment in 7 years of education over 6 years increased from 16.6 percent to 35.3 percent when adjusted by unemployment, and to 19.0 percent when adjusted by economic growth. The unemployment adjustment changed the social rate-of-return on 7 years of education from the least profitable to the most profitable because of the high unemployment rate of those who have 6 years of education. Both the social and private rates-of-return in the lower secondary improved significantly when unemployment and economic growth were taken into account either separately or together making the investment on that level very profitable as compared to the upper secondary.

The influence of the unemployment adjustment changed the apparent order of investment efficiency. The economic growth and alpha adjusted rates were found to follow the same pattern as the unadjusted rates. For example, while the social investment on 7 years of education increased from 16.6 percent to 19.0 percent when economic growth was taken into account, and decreased to 10.4 percent when alpha coefficient was applied, the investment still remained the least profitable as compared to other levels.

While the individual influences of unemployment and economic growth were found to increase both the social and private average rates-of-return on secondary education over primary, their separate effects on the marginal returns were found to be acting in opposite directions. For example, the unemployment adjusted marginal rates-of-return were found to be lower than the unadjusted rates for grades 8, 9 and 10 while the economic growth adjusted rates for the same levels were found to be higher than the unadjusted rates. The unemployment adjusted marginal rates for grades 11, 12 and 13 were found to be higher than the unadjusted rates, while the economic growth adjusted rates for the same levels were found to be lower than the unadjusted rates.

The social and private internal rates-of-return show that the economic growth and unemployment adjustments have the tendency to change the returns on educational investments. The higher unemployment rates of the labor force with primary education have the tendency to widen the earning differentials. The higher earnings of the labor force with secondary education will change substantially in absolute terms for any unemployment rate thus reducing the earning differentials. The economic growth adjustment was found to affect all earnings differentials uniformly. Similarly, the economic growth adjustment had a uniform effect on foregone earnings and thus increased the opportunity costs of education. For example, the economic growth adjusted marginal social rates-of-return for grades 11, 12 and 13 were lower than the unadjusted social rates-of-return. Overall, the alpha adjusted social and private rates-of-return were found to be generally lower than other adjusted and unadjusted rates-of-return.

The rates-of-return shown in Tables 31 through 38 indicate that once the influence of each adjustment is known, their combined influences can be accurately predicted.

The findings show that the unemployment and economic growth adjustments separately and in combination, increase the rates-of return to the investment on secondary education. The alpha coefficient adjustment was found to reduce the returns substantially. Because of the opposing effects of the adjustments, the influence of the three combined factors nearly cancelled each other.

Table 39 shows that when the costs and benefits were adjusted by all factors, the adjusted social rates-of-return differed from the unadjusted figures. The unadjusted rates-of-return, especially for the upper secondary, were higher, in most cases, by not more than two percentage points, than the adjusted rates. Similar observations were made regarding the marginal social rates-of-return. The conclusion can be made that, in as far as the monetary benefit of secondary education is concerned, the unadjusted internal rate-of-return provides an acceptable approximation to make decisions in the investment on secondary education.

SOCIAL AND PRIVATE PRESENT VALUES

The social and private present values which are shown in Tables 29 and 30 were computed for six selected discount rates. While the internal rates-of-return which were discussed above show which levels of education are the more efficient investment, the present values indicate which levels of education maximize the monetary returns at different discount rates.

The present values of secondary education over primary

Table 39

Comparison of Adjusted and Unadjusted Internal Rates-of-Return by Level of Secondary Education Over 6 years of Education; Bahamas Males: 1970

Education Level	Social Internal Rates-of-Return			Private Internal Rates-of-Return		
	Rates Unadjusted	Rates of the combined adj. of emp. Econ. and Alpha	Diff. in percentage points (col. 3-2)	Rates Unadjusted	Rates of the combined adj. of Emp. Econ. and Alpha	Diff. in percentage points* (col. 6-5)
1	2	3	4	5	6	7
6-7	16.6	22.6	+6.0	107.5	152.8	+45.3
6-8	24.3	21.7	-2.6	151.8	130.1	-21.7
6-9	19.6	17.5	-2.1	106.2	89.7	-16.5
6-10	17.4	15.3	-2.1	29.2	25.9	-3.3
6-11	16.9	15.3	-1.6	23.9	21.9	-2.0
6-12	18.0	16.4	-1.6	24.3	22.6	-1.7
6-13	18.3	16.8	-1.5	23.7	22.2	-1.5

Source: Tables 8 and 15

*The plus sign shows the percentage points of the combined adjustment rates greater than the unadjusted rates, while the negative sign shows the percentage points of the combined adjusted rates lower than the unadjusted rates.

education showed that the private and social investments on secondary education are an attractive investment for almost all discount rates and adjustments employed in this study. As expected, the present values of additional lifetime earnings of any level of education varied with the level of discount rates, the highest values were for a zero percent discount rates and the lowest values were for a 12 percent discount rate.

The unadjusted private present values of 9 years of education over 6 years were found to be $31,438 at a zero percent discount rate, and $3,559 at a 12 percent discount rate. The social present values for the same level and discount rates were found to be $29,731 and $1,852, respectively. On the other hand, the private present values of 13 years of education over 6 years were found to be $231,074 at a zero percent discount rate, and $13,199 at a 12 percent discount rate. The social present values for the same level and discount rates were found to be $227,091 and $9,764, respectively.

The unadjusted marginal present values show that the most profitable grade within the lower secondary is grade 8 at all discount rates, followed by grade 7 and grade 9 at 8 percent discount rate and above. The present values confirm the findings based up on the internal rates-of-return. At the upper secondary level, especially at discount rate of 8 percent and above, the marginal present value of grade 12 was found to be higher than the others. This was followed by grade 13, grade 11 and grade 10, respectively. The very high internal rates-of-return for the lower secondary level were not reflected in very high present values because of the low value of the investment of the lower secondary as compared to the upper secondary.

As mentioned previously, the unemployment and economic growth adjustments individually and in concert increased the social and private present values of different amounts of secondary education over primary education while the alpha adjustments were found to decrease the values for the same levels. The effect of each adjustment varied with the discount rates employed and the level of secondary education. For example, the effect of the unemployment adjustment was found to be stronger at the higher discount rates affecting the lower secondary more than the upper secondary. On the other hand, the effect of the economic growth adjustment was found to be stronger at a zero percent discount rate affecting the upper secondary more than the lower secondary. However, except for the present value of grade 7 over grade 6 beyond a zero percent discount rate, the economic growth adjusted social and private present values of different amounts of secondary education over primary were found to be higher than the unemployment adjusted values. While the alpha adjusted values at a zero percent discount rate were about 60 percent of the unadjusted values, the effect of alpha on the upper secondary at a 12 percent discount rate was to reduce the present values to about 40 percent of the unadjusted values in most cases. The various effects of each adjustment show up in the results obtained for the different combinations of the adjustments. For example, the present values obtained when all three adjustments were combined show that at a zero percent discount rate the adjusted value for each secondary grade over primary was higher than the unadjusted because of the strong influence of the economic growth adjustment. Beyond a zero percent discount rate, except for the value of grade 7 over grade 6 all adjusted values were found to be lower than the unadjusted values.

The findings show that the social present values were affected more than the private present values when individual and combined adjustments of factors other than education were taken into account. For example, the alpha adjustment turned seven marginal and average social present values from positive to negative. Adjustments for economic growth, alpha, and unemployment individually and in various combinations resulted in several negative marginal and average social present values at high discount rates. The corresponding private present values were generally positive for the same adjustments.

COMPARISON OF PRESENT VALUES AND INTERNAL RATES-OF-RETURN

The present values and internal rates-of-return were employed to evaluate the economic value of the secondary education. Both evaluation models provide information of value in making decisions about educational investment. However, the results may lead to conflicting decisions for the following two reasons.

(a) The prioritization by present values of a given investment varies with the discount rates employed. The present value criteria also tends to favor large investment projects.

(b) The cost components may vary from one level of education to the next.

Table 40 shows the present values at 12 percent discount rate and the internal rates-of-return for marginal earnings which can be used to demonstrate the relative profitability of each secondary grade using selected adjustments employed in this study. The 12 percent discount rate is large enough to accommodate real economic growth and inflation. Since both the social and private returns show the same tendency, the private returns were used for the purpose of comparing the present values and internal rates-of-return.

The example shown in Table 40 indicates that the ordering of profitability by present values and internal

Table 40

Comparison of Private Present Values and Internal Rates-of-Return to Marginal Investment in Secondary Education by Adjustments; Bahamas Males: 1970[1]

	Private Present Values and Internal Rates-of-Return Adjusted by									
	Unadjusted		Unemployment		Economic		Alpha Coefficient		Unemp., Econ. and Alpha	
Level of Education	Present Value at 12% discount rate	Internal Rates-of-Return	Present value at 12% dis- count rate	Internal Rates-of-Return	Present Values at 12% discount rate	Internal Rates-of-Return	Present Values at 12% discount rates	Internal Rates-of-Return	Present Value at 12% dis- count rate	Internal Rates-of-Return
1	2	3	4	5	6	7	8	9	10	11
(1) 6-7	855	107.5	1657	'a'	1091	111.7	474	65.7	1155	152.8
(2) 7-8	2053	196.9	1896	172.7	2666	'a'	1193	118.1	1448	107.4
(3) 8-9	651	31.2	609	29.5	955	33.9	352	24.9	502	26.3
(4) 9-10	1672	18.2	1604	18.2	2887	20.6	115	12.5	895	15.1
(5) 10-11	2038	18.2	2172	19.5	1028	13.3	341	13.2	1455	16.5
(6) 11-12	3149	25.3	3694	30.3	-385	11.6	1040	16.6	2560	22.1
(7) 12-13	2781	21.5	2878	23.1	-4390	8.9	758	14.9	1948	18.3

Source: Tables 30, 31, 32, 33, and 38.

'a' denotes internal rates-of-return over 200 percent.

[1] Even though the present value and internal rate-of-return criteria indicate different measure, the results in this case are consistent because of the same investment and other features of each of the investment.

rates-of-return rarely coincide, if all the marginal investments on additional education were considered together. However the separating of the two levels, that is lower secondary, row 1-3, and upper secondary, row 4-7, as shown in Table 40, and ordering the returns within each level by present values or internal rates-of-return leads to the same conclusions as to the profitability of education, with minor exception. For example, at the lower secondary, while the unemployment adjusted internal rates-of-return for grade 7 over grade 6 was found to be the most profitable, followed by grade 8 over grade 7, the present value approach for the same adjustment reversed the positions of the two levels. Similar observation can be made of the results obtained by combined adjustment of economic growth, alpha and unemployment.

The exceptions cited above and others are minor to lead to conflicting decisions. The same decisions could be reached either by using the results of the present values or the internal rates-of-return in almost all adjustments provided secondary education is divided into two levels, lower and upper secondary.

The results of the present values and internal rate-of-return in this study are compared to other studies in the section which follows.

COMPARISON WITH OTHER STUDIES

There is no other research in the Bahamas with which to compare the findings of this study. Therefore, the results are compared only with the studies in other countries.

In Chapter III, a summary of other studies and the methodologies employed were presented. Here only a few studies are quoted for purposes of comparing the findings with this study. Because of the dissimilarities of the population covered, assumptions made in each study and the period covered in each study, the comparisons of findings are intended to show only the approximate magnitude of returns.

Hansen (1968), using the 1950 United States census of population, reported the male social internal rates-of-return for grades 8, 10 and 12 over grade 7 to be 29.2, 16.3 and 15.3 percent respectively. The corresponding unemployment adjusted social rates-of-return in this study were found to be 28.1; 17.0; and 18.8 percent, respectively. Twelve years of education over 7 years in the Bahamas was found to be more profitable than was the case in the United States. The returns to the other two levels were very similar in both countries.

The private rates-of-return as reported by Hansen for grades 8, 10 and 12 over grade 7 were found to be infinite, 25.9, and 23.3 percent, respectively. Hansen assumed that 8 years of education was costless to the individual students resulting in an infinite private rate-of-return to that level. In this study, the unemployment adjusted private internal rates-of-return for the above grades compared were found to be 172.0; 25.6; and 24.6 percent, respectively. The findings of the private rates-of-return as reported by Hansen and in this study are very similar for the levels shown.

Carnoy (1967), using a sample of the 1963 male urban wage earners in Mexico, reported the unadjusted private internal rates-of-return for grade 8 over grade 7, grade 11 over grade 9, and grade 13 over grade 12 to be 36.5, 17.4, and 15.8 percent, respectively. The equivalent unadjusted private rates-of-return for the same levels in this study were found to be 196.9; 18.2; and 21.5 percent, respectively. Furthermore, Carnoy reported the unadjusted social internal rates-of-return for grade 8 over grade 7, grade 11 over grade 9, and grade 13 over grade 12 to be 23.4, 14.2, and 12.4 percent while the social rates-of-return for the same level in this study were 30.8, 16.0, and 19.3 percent, respectively. The unadjusted rates-of-return to education in the Bahamas were found to be substantially higher than the rates in Mexico.

Carnoy also reported the internal rates-of-return holding father's occupation, industry, city of occupation, and school attendance constant. Carnoy found the private internal rates-of-return for grades 8 over 7, grade 11 over grade 9, and grade 13 over grade 12 to be 24.0; 16.8; and 22.4 percent, respectively. The corresponding finding in this study is the alpha adjusted private rates-of-return of 118.1, 13.0, and 14.9 percent, respectively, for the grade levels compared. Similarly the social rates-of-return for grade 8 over grade 7; grade 11 over grade 9; and grade 13 over grade 12, as reported by Carnoy, were found to be 17.1; 13.2; and 16.7 percent, respectively. The corresponding alpha adjusted social rates-of-return for the same levels in this study were found to be 20.2; 11.3; and 13.3 percent, respectively. The unadjusted rates-of-return of the Bahamas lower secondary education were found to be generally higher than the Mexican lower secondary education. On the other hand, the Mexican upper secondary education was found to be more profitable than that in the Bahamas when data were adjusted by factors other than education.

Blaug (1971), using a sample of 1970 male and female urban wage earners in Thailand, reported the adjusted social internal rates-of-return for grade 10 over grade 7, and grade 12 over grade 10 to be 11 and 10 percent, respectively. The equivalent social rates-of-return in this study were the rates adjusted by alpha. The corresponding social internal rates-of-return for the grades compared above were found to be 12.2, and 13.0 percent, respectively. These social internal rates-of-return show that the Bahamas secondary education, at least for the grades compared, is slightly more profitable than the secondary education in Thailand.

Further comparisons of internal rates-of-return of the Bahamas secondary education may be made with the findings in other countries in addition to the ones already indicated above. Psacharopoulos (1973) and others had already compiled enough studies for this same purpose. By and large, the economic returns of education in less developed countries were found to be higher than those in developed countries.

SUMMARY

In this chapter, the findings reported in Chapter VI were discussed. The present values and internal rates-of-return in this study were also compared in order to assess the similarities or differences of the two in ordering investment returns for decision making. In most cases, the results using the two models lead to the same decision. Furthermore, the findings in this study were compared with similar findings in other studies to see whether or not the Bahamas secondary education is more or less profitable than that in other countries. By and large, the Bahamas secondary education was found to be more profitable than secondary education in other countries. In the Chapter VIII the study is summarized and conclusions and implications for further research are drawn.

CHAPTER VIII

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

PURPOSE OF THE STUDY

The major purpose of this study was to make an economic evaluation of the social and private returns to different amounts of secondary education of the Bahamas male labor force. The human capital theory and framework, which were discussed in Chapters II and III, provided the basis for the study. The assumptions in human capital and the subsequent measurements employed are fundamental to the conceptualization of the study. Some of the major assumptions of human capital theory accepted for this study were the following:

1. Physical and human capital are conceptually similar requiring similar analytical techniques.

2. Cross-section data based on census of population are assumed to provide accurate information on earnings by age and education.

THE SUBJECTS

The economically active Bahamas male labor force with different amounts of secondary education was the subject of this study. The male subjects included in this study were those of age 15 to 60 inclusive.

RESEARCH PROCEDURES

The investment analysis of secondary education involved the weighing of monetary costs and benefits to compute the social and private present values of additional lifetime earnings and the internal rates-of-return associated with given levels of secondary education. The 1970-71 school year was the focal date for the analysis of investment.

COST AND BENEFIT DATA

The private direct costs of education in this study included tuition fees, expenditures on books, equipment and supplies minus subsidies. The social direct costs were the total costs of secondary education which included subsidies to students, salaries and wages, private and institutional expenditures on books, equipment and supplies, administrative costs, and capital costs. The direct private and social costs were based primarily on a sample survey for the 1970-71 academic year. In addition, the cost of secondary education included the foregone earnings which were derived directly from the education-age mean annual earnings streams. The mean annual earnings by age and education were calculated from the data obtained in the *1970 Census of Population*.

EVALUATION PROCEDURES

The present values of net monetary benefits and internal rates-of-return techniques were used to estimate the social and private returns to different amounts of secondary education. The present values were computed at 0, 5, 6, 8, 10, and 12 percent discount rates for eight different adjustments, namely (1) unadjusted in which only the employed male labor force was considered, (2) adjusted for unemployment rates by age and education, (3) adjusted for a secular growth of 2 percent, (4) adjusted for an alpha coefficient of 60 percent, (5) adjusted for unemployment rates and secular growth rate, (6) adjusted for unemployment rates and an alpha coefficient, (7) adjusted for an alpha coefficient and secular growth rate, and (8) adjusted for unemployment rates, an alpha coefficient and secular growth rate. The internal rates-of-return were also calculated for all the eight adjustments.

CONCLUSIONS

The external rate against which the profitability of an investment can be compared has not been established for this study. The six different discount rates employed in this study were expected to provide a range of returns appropriate to an external standard.

The findings generally show that secondary education is an attractive investment both for individuals and the society at large at most discount rates and adjustments. Each grade at the secondary level became an even more attractive investment when unemployment and secular growth were taken into account.

The results show that in a country, such as the Bahamas, where the unemployment rate is high for those who have only elementary education, the acquisition of some high school education is very profitable. For those who wish to have some secondary education but do not wish to complete grade 13, 8 years of education is the most profitable in terms of internal rates-of-return and present values. Even though there is no threshold established below which no investment should not be made, the returns to grade 9 is relatively small and it becomes important only for those who wish to acquire education beyond grade 9.

The social and private internal rates-of-return were found to be high at lower secondary going down successively up to grade 11 and increasing slightly at grades 12 and 13. The progressively lower rates-of-return for successively higher levels of education up to grade 11 are consistent with the proposition of capital theory that continued investment in a given activity yields a declining rate-of-return. But the internal rates-of-return to the 12th and 13th years of education departs from the declining rate-of-return proposition of investment theory. The reason for this discrepancy is, perhaps, due to the non-Bahamians in the labor force with 12 and 13 years of education who earn higher incomes than do the Bahamian nationals.

The average returns described above carry with them the influence of the various marginal returns. To understand the average returns to blocks of education, it may be appropriate to investigate the marginal returns to adjacent grades. For four out of eight adjustments, the marginal social present values of grade 9 were found to be negative at a 12 percent discount rate. A similar result was found in the social internal rates-of-return. The influence of the alpha coefficient adjustment was responsible for some negative social marginal returns at a 12 percent discount rate. Moreover, the marginal social returns, adjusted by the secular growth rate reduced the attractiveness of some investments.

The findings of this study reveal that the lower secondary levels yield the highest returns in terms of private internal rates-of-return. Private investments on grades 7, 8 and 9 yielded returns anywhere from 65 percent to over 200 percent. The highest social internal rates-of-return were also found in the lower secondary. On the other hand, the upper secondary grades yielded lower rates-of-return but higher present values than the lower secondary because of the higher volume of the investment at the upper secondary level.

Life-time earnings profiles, created from census data, reflect the earnings of employed people. To account for the possibility of unemployment, the earnings profiles were reduced according to the unemployment rates of various age-groups and education. The inclusion of unemployment rates for each age-group and education level increased both the private and social returns to secondary education. This result is the reflection of the high unemployment rate of individuals who have 6 years of education especially between the ages 15 to 24.

The adjustment of age-education-earnings profiles by the secular growth rate widened the earnings differentials. In most cases, especially at the upper secondary level, the 2 percent secular growth increased the unadjusted internal rates-of-returns by about 2 percentage points. This phenomenon did not hold for some marginal rates within the upper secondary grades. Since the secular adjustment was applied to the opportunity costs as well as the returns, the widening of earnings differentials attributed to upper grades were not enough to overcome the increased opportunity costs.

Furthermore, the alpha adjustment reduced, as expected, returns to all levels of secondary education. However, except in a few cases, the marginal social and private returns in secondary education adjusted by alpha coefficient were found to be profitable at or beyond a 12 percent discount rate. In other words, the effect of education on earnings was found to be positive even after the effects of other factors assumed to be responsible for earnings differentials were removed. When the alpha adjustment was combined with the unemployment adjustment or the secular growth adjustment or both, the social and private present values and internal rates-of-return were found to improve in almost all cases.

The secular growth and unemployment adjusted social and private present values and internal rates-of-return were found to be the highest in almost all cases, while the results of the three combined adjustments were found to be smaller than but close to the unadjusted results. However, except the social return to 9 years of education over 8 years, which was found to be unprofitable at or beyond a 12 percent interest rate, the results of the combined adjustments were found to yield anywhere from a 15 to a 23 percent interest rate. The returns to private investments varied from a minimum of 22 to a maximum of 153 percent.

IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Implications

Some immediate implications of the findings for the Bahamas are presented below.

(a) The past and future social and private investments on secondary education in the Bahamas are financially attractive. The knowledge if disseminated may help parents and/or individual students in their decisions. The Bahamas could use the information provided in this study to allocate its resources among education and other social and economic activities.

(b) The rates-of-return indicate that further investment to expand secondary education is justifiable. This policy direction is particularly applicable for education beyond the compulsory age of 14 or after grade 9.

(c) From the standpoint of students, the direct costs and the costs of their time while attending school appear to be a profitable investment. Even the poor should consider entering into debt to obtain secondary education. The Government of the Bahamas should consider a loan system for those students who are academically qualified but financially unable to pursue their education at the upper secondary level.

Recommendations for Further Research

This study dealt with the economic value of secondary education for the total male labor force. In the process of investigating and analyzing this central problem, a number of related issues have surfaced. These issues for further research include the following:

1. The present study included all the male labor force without regard to nationality and socio-economic background.

The high marginal returns obtained for grades 12 and 13 could be due to distortion introduced by those foreign workers. It seems appropriate to investigate the economic returns using a data stratified by nationality and socio-economic background.

2. The present study did not include the cost of grade repetition. The inclusion of this factor in the rate-of-return analysis would likely increase the social and private costs of education thereby reducing the returns.

3. The present study did not include the mortality of the male labor force. The inclusion of this factor in the rate-of-return analysis would likely reduce the lifetime earnings of the labor force thereby reducing the returns.

4. The present study included the total male labor force without regard to occupation. The inclusion of occupation classification in the rate-of-return analysis would likely generate different returns for the same education.

5. The present study included the total male labor force without regard to the type of schools attended. The inclusion of school type in the rate-of-return analysis would likely generate different returns for those who attended government and independent secondary schools.

6. The present study was based on the 1970 cenus of population. It seems appropriate to repeat the investigation

using data of the forthcoming 1980 census of population.

7. The present study did not include the female labor force.

In human capital theory, it is assumed that people invest in themselves for economic reasons. Observations of earnings reveal that higher education is usually associated with higher earnings. Such monetary returns can be a source of motivation for people to get more education. Secondly, education, particularly formal education, is found to take a substantial share of national resources in most countries. These two phenomena alone justify the economic analysis of education.

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APPENDIX A

QUESTIONNAIRE FOR STUDY OF SECONDARY SCHOOLS IN THE BAHAMAS

QUESTIONNAIRE FOR STUDY OF SECONDARY SCHOOLS
IN THE BAHAMAS

(This Questionnaire is to be filled by an interviewer)

1. General Information

(a) Name of person interviewed ______________

Position ______________

(b) Name of School ______________________________

Address ____________________________________

(c) Type of School: (1) Government __,

(2) Independent __,

(3) Other ___________________

(d) Date of interview ___________________

2. Enrollments

The figure should refer to the 1970/71 academic year for secondary level students of grade 7 to 13 inclusive.

Grade	No. of students	No. of classes
7		
8		
9		
10		
11		
12		
13		
Total		

3. Staff

The figure should refer to the 1970-71 academic year for secondary level personnel and teachers of grades 7 to 13 inclusive.

(a) How many full-time teachers were in this school?

____

(b) How many non-teaching staff were employed in this school? __________ (Non-teaching staff means administrators, clerks, drivers, office boys, janitors, and all those not directly involved in classroom teaching).

4. Expenditures of School

The figures should refer to the 1970-71 academic year for grades 7-13 inclusive. The expenditures here refer to the costs incured by Government or institution.

(a) What was the total expenditure on

1. salaries and wages paid to teaching staff B$ __________
2. salaries and wages paid to non-teaching staff B$ __________
3. supplies, books and instructional equipment B$ __________
4. repair and maintenance? B$ __________
5. fuel? B$ ______ (fuel means gasoline, water, light)
6. out of school activities? B$ __________ (out of school activities mean sports, school festival, etc.)

7. medical care? B$ __________

8. student transportation to and from school? B$ __________

9. scholarship and bursary to students? B$ __________

10. student board and room? B$ __________.

(b) School buildings

(1) Fill in the information on school buildings by type of construction in the columns provided below.

Type of building construction	No. of buildings	Age of building up to 1970	Estimated remaining life	Cost when building constructed
Wood	1			
	2			
	3			
	4			
	5			
Concrete	1			
	2			
	3			
	4			
	5			
Others	1			
	2			
	3			
	4			
	5			

(2) How much were the total expenditure on other constructions for the new buildings during 1970-71 academic year? B$ __________ (Other constructions mean landscaping, fitting outside buildings, playfields, site improvement, etc.).

5. Earnings of Secondary Level Students During 1970-71

Academic Year

The earnings are due to parttime and summer employment of the secondary level students by grade level. Fill in the information in the space provided below.

Grades	Total no. of Stud.	No. Employed & total annual earnings	
		Total No. employed	Total Annual earnings
7			
8			
9			
10			
11			
12			
13			
Total			

6. Expenditure Incurred by Students During 1970-71 Academic Year

The cost should refer only to those costs that are due to school attendance.

Grades	Costs/student/year by items of expenditure				
	Tuition	Books, supplies & equipment	Travel to & from school	Board & room	Other (specify)
7					
8					
9					
10					
11					
12					
13					

APPENDIX B

DISTRIBUTION OF ECONOMICALLY ACTIVE MALE LABOR FORCE, AGE 14 AND OVER, BY EDUCATION, AGE-GROUP AND INCOME RANGE; BAHAMAS: 1970

Table B-1

Distribution of Economicaaly Active male, 14 Yeara and Over,
by Age-Group and Income Range; Bahamas: 1970

Age-Group	Total Economically Active Men	Distribution by Income Range (B$)													
		Nil-1000	1001-3000	2001-3000	3001-4000	4001 5000	5001 7500	7501 10000	10001 12500	125001-15000	15001-17500	17501-20000	20001-30000	30001-40000	40001-and over
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	327	210	65	52			-	-	-	-	-	-	-	-	-
15-19	4067	1008	790	1091	685	317	156	14	6						
20-24	5916	622	550	1168	1252	1034	856	291	97	33		13			
25-29	6782	417	551	1090	1047	1160	1264	624	318	167	65	36	34	6	
30-34	5866	402	445	878	820	856	1047	617	318	201	115	74	71	11	
35-39	4611	285	384	749	658	644	751	440	239	174	100	96	64	14	
40-44	3692	342	312	575	526	495	533	305	197	122	64	83	138		
45-49	2947	303	229	487	366	358	399	263	137	98	66	62	62	47	
50-54	2757	374	363	446	358	306	310	181	107	96	66	51	54	45	
55-59	2167	367	298	338	262	231	219	127	158		37	37	93		
60-64	1289	549	199	203	136	130	128	96	47	32	41		55		
65+	1363		295	219	112	116	92	65	36	23	32		18	28	
Total	41784	4879	4551	7280	6233	5652	5755	3023	1593	1000	559	487	463	128	181

Source: Report of 1970 Census of Population, Table 584, p. 294

Table B-2

Distribution of Economically Active male, Age 14 and Over, by Education and Income Range; Bahamas: 1970

Education Completed	Total Economically Active Men	Distribution by Income Range													
		Nil-1000	1001-2000	2001-3000	3001-4000	4001-5000	5001-7500	7501-10000	10001-12500	12001-15000	15001-17500	17501-20000	20001-30000	30001-40000	40001-& over
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	2237	591	419	580	294	176	109	51			12			5	
1	206	58	43	43	29	22	11		--	--	--	--	--	--	--
2	370	78	75	98	57	33	18	8		3		--	--	--	--
3	468	104	72	136	80	23	50			3		--	--	--	--
4	959	171	185	249	182	80		87			5		--	--	--
5	1208	208	214	335	203	104	91	44		4			5		
6	2298	319	330	589	413	329	221	77			20				--
7	2697	396	368	656	470	366	275	103	43		15			5	
8	6590	849	861	1310	1149	994	924	337	82	37	16		26	5	
9	6262	980	805	1157	1012	970	839	296	92		75		33		3
10	5494	534	514	936	982	932	905	384	134		108		54		11
11	2991	322	222	436	422	494	504	255	151	72	43		53	17	
12	3577	158	218	377	442	521	703	471	265	168	151		82		21
13	1640	92	56	131	174	195	283	264	175	96	62	48		74	
14+	4787	19	169	247	324	413	773	757	615	475	263	272	268	75	117
TOTAL	41784	4879	4551	7280	6233	5652	5755	3023	1593	1000	559	487	463	128	181

Source: Report of the 1970 Census of Population, Table 710, p. 389.

APPENDIX C

EMPLOYMENT RATES OF ECONOMICALLY ACTIVE MALE LABOR FORCE BY AGE-GROUP AND EDUCATION;

BAHAMAS: 1970

EMPLOYMENT RATES OF ECONOMICALLY ACTIVE MALE LABOR FORCE BY AGE-GROUP AND EDUCATION; BAHAMAS: 1970

Age-Group	Total Employment Rate by Age-Group	% of Employment by Education							
		6	7	8	9	10	11	12	13
15-19	85.0	78.9	86.1	86.2	86.1	83.4	83.5	86.8	87.1
20-24	93.5	89.0	93.1	93.0	93.0	93.8	93.8	95.0	95.1
25-29	96.3	94.9	96.4	96.6	96.6	95.3	95.3	97.8	97.7
30-34	96.6	95.5	95.9	95.9	96.0	97.4	97.3	97.8	97.6
35-39	96.6	96.0	96.3	96.1	96.1	97.0	97.2	97.7	97.4
40-44	95.5	94.1	94.9	94.9	94.8	96.1	96.3	97.3	97.4
45-49	94.8	93.0	94.3	94.3	94.3	95.5	96.0	96.5	96.0
50-54	94.3	91.9	93.2	93.5	93.8	95.4	96.0	96.9	97.5
55-59	92.7	90.8	91.4	92.0	91.9	94.3	93.9	96.2	93.2
60+	84.7	83.0	81.6	81.2	81.1	88.6	89.1	93.2	94.9
Total Employment rate	93.1	91.2	92.7	92.6	92.0	93.2	93.3	95.8	95.9

Source: Table 20.

APPENDIX D

DISTRIBUTION OF EMPLOYED MALE LABOR FORCE BY EDUCATION, AGE-GROUP AND INCOME RANGE; BAHAMAS: 1970

Table D-1

Distribution of Employed Male Labor Force By Income Range and Education for Each Age-Group; Bahamas: 1970

Age-Group	Grade Completed	Number Employed	Distribution by Income Range													
			0+ 1000	1001- 2000	2001- 3000	3001- 4000	4001- 5000	5001- 7500	7501- 10000	10001- 12500	12501- 15000	15001- 17500	17501- 20000	20001- 30000	30000 40000	40000 +
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	5	2	3	-	-	-									
	1	-	-	-	-	-	-									
	2	1	-	1	-	-	-									
	3	1	-	-	1	-	-									
	4	1	-	-	1	-	-									
	5	3	1	2	-	-	-									
	6	8	2	4	2	-	-									
14	7	13	2	7	3	1	-									
	8	43	8	18	12	5	-									
	9	66	15	26	16	5	4									
	10	7	2	3	1	-	1									
	11	1	1	-	-	-	-									
	12	-	-	-	-	-	-									
	13	1	-	1	-	-	-									
	14+	-	-	-	-	-	-									
	Total	150	33	65	36	11	5									

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	58	13	23	16	4	2									
	1	5	2	3	-	-	-									
	2	5	2	2	1	-	-									
	3	18	7	3	5	3	-									
	4	21	4	8	7	2	-									
	5	43	4	19	14	6	-									
	6	120	14	40	48	18	-									
15-19	7	199	31	61	67	29	7	3	1							
	8	525	58	145	181	102	31	7	1							
	9	830	111	207	282	157	53	20	-							
	10	636	48	144	218	147	58	19	2							
	11	420	45	69	129	93	55	26	2	1						
	12	289	3	50	76	69	54	32	3	-	1	1				
	13	128	6	13	29	29	30	19	2	-	-	-				
	14+	109	-	3	18	26	27	30	3	-	-	-	1	1		
	Total	3406	348	790	1091	685	317	156	14	1	1	1	1	1		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
20-24	0	174	23	36	63	34	14	2	2							
	1	10	2	2	2	3	1	-	-							
	2	15	2	3	4	4	1	1	-							
	3	48	5	7	19	10	4	3	-							
	4	69	5	13	24	17	7	3	-							
	5	117	10	21	46	24	8	8	-							
	6	211	11	27	77	53	36	5	2							
	7	323	14	44	112	81	42	27	2	1						
	8	818	39	111	181	205	255	83	2	2	2					
	9	856	53	114	195	217	177	92	4	4	1					
	10	902	15	85	183	248	203	134	29	4	1					
	11	558	16	41	101	128	122	100	36	9	2	2	1			
	12	612	2	32	80	113	138	157	62	20	5	2	1			
	13	292	5	8	28	49	46	86	50	14	3	1	1	1		
	14+	486		6	29	51	80	155	102	43	12	3	3	1	1	
	Total	5491	202	550	1,168	1252	1034	856	291	97	24	8	6	2	1	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	245	27	55	72	49	33	52	2	1	1					
	1	25	3	5	7	5	4	1	-	-	-					
	2	46	3	9	13	10	9	2	-	-	-					
	3	63	7	9	19	15	4	8	1	-	-					
	4	142	1	37	40	33	14	14	2	1	-					
	5	158	4	28	45	36	22	18	5	-	-					
	6	316	5	40	91	69	66	33	8	4	-					
25-29	7	350	18	40	94	73	66	50	9	-	-					
	8	934	32	100	190	192	190	174	49	5	2					
	9	936	46	88	181	166	203	181	52	10	6	1	2			
	10	900	13	55	148	166	201	209	68	20	10	5	2	3		
	11	506	12	33	50	76	110	120	53	31	13	5	1	2		
	12	669	3	24	71	68	116	176	108	59	23	11	4	1	1	
	13	337	4	10	24	24	36	80	74	43	20	15	3	4	-	-
	14+	902	3	18	45	65	86	193	193	144	92	23	19	17	3	1
	Total	6529	181	551	1090	1047	1160	1264	624	318	167	60	31	30	4	2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
30-34	0	279	17	46	117	44	26	22	2	2	1	-	-	2		
	1	31	4	6	9	6	2	4	-	-	-					
	2	47	3	10	19	8	5	2	-	-	-					
	3	55	4	8	23	8	4	7	1	-	-					
	4	137	14	21	44	30	14	10	2	2	-					
	5	144	19	20	44	26	16	12	5	1	1					
	6	294	12	30	67	64	80	32	5	2	2					
	7	354	18	33	82	71	64	53	26	5	1					
	8	825	32	84	156	149	161	161	67	7	4	1	2	1		
	9	761	49	71	110	129	134	168	67	15	7	7	2	2		
	10	721	15	39	96	121	130	183	82	27	12	9	3	2	2	
	11	398	11	16	35	38	64	111	54	34	16	9	4	4	1	1
	12	527	3	25	29	56	71	107	109	56	37	15	9	10	1	1
	13	247	5	4	11	21	28	39	50	36	24	11	8	10	-	-
	14+	833	1	32	36	49	57	136	149	131	95	57	42	36	6	6
	Total	5653	207	445	878	820	856	1047	617	318	201	109	70	67	10	8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
35-39	0	251	18	45	65	46	26	23	5	1	1	1				
	1	15	1	1	5	3	4	1	-	-	-	-				
	2	52	5	7	22	9	4	3	2	-	-	-				
	3	47	3	7	18	10	1	6	1	-	1	-				
	4	107	6	16	36	28	10	8	2	-	-	1				
	5	135	7	13	52	33	13	11	4	1	-	1				
	6	238	8	25	60	64	29	44	3	2	1	1	1			
	7	285	14	34	66	54	55	44	12	3	1	1	1			
	8	691	23	73	135	120	126	138	58	7	6	1	2	2		
	9	624	28	71	95	92	123	126	60	10	7	7	3	1	-	1
	10	519	9	36	70	87	94	118	56	24	9	8	5	1	2	-
	11	277	8	14	36	22	48	52	39	29	10	6	5	7	-	1
	12	385	2	23	27	40	42	83	59	41	30	14	13	8	2	1
	13	184	1	8	10	16	21	22	28	31	20	8	11	6	1	1
	14+	632	3	11	32	34	48	72	111	90	88	45	48	36	8	6
	Total	4442	136	384	749	658	644	751	440	239	174	94	89	61	13	10

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	190	23	32	52	36	22	17	6	1	-	1				
	1	15	5	3	3	2	1	-	1	-	-	-				
	2	34	4	6	9	7	4	3	1	-	-	-				
	3	40	5	5	11	9	4	3	3	-	-	-				
	4	80	7	12	21	17	12	8	2	1	-	-				
	5	87	8	13	23	17	12	7	5	1	1	-				
	6	208	12	24	67	30	36	23	7	3	2	1	1	2		
40-44	7	243	21	25	63	45	35	30	12	4	3	2	1	1	1	
	8	612	34	63	115	107	103	116	47	14	6	2	3	2	-	
	9	497	40	50	76	86	90	88	33	17	6	4	3	2	1	1
	10	440	17	30	55	79	78	89	44	24	8	5	5	24	1	1
	11	184	10	8	24	18	32	30	21	16	8	4	6	6	1	-
	12	252	3	15	22	27	27	47	36	26	18	7	9	10	2	3
	13	113	5	1	8	14	6	10	17	17	8	5	9	11	1	1
	14+	529	3	25	26	32	33	62	70	73	62	29	42	50	10	12
	Total	3524	197	312	575	526	495	533	305	197	122	60	79	88	17	18

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	164	22	32	48	23	16	13	6	2	1	-	1			
	1	13	1	3	3	1	2	2	1	-	-	-	-			
	2	31	4	6	8	6	2	2	2	-	-	1	-			
	3	40	6	6	11	10	1	3	3	-	-	-	-			
	4	73	7	14	19	18	7	5	2	-	1	-	-			
	5	96	9	17	26	16	11	12	3	1	-	-	-	1		
	6	185	9	27	54	31	21	29	10	-	2	1	-	1		
45-49	7	217	17	30	51	34	31	27	18	3	3	1	1	1		
	8	482	34	61	94	73	72	91	33	14	5	3	-	2		
	9	350	32	44	57	49	60	53	30	12	4	4	2	2	1	
	10	296	11	27	48	37	55	54	39	7	6	5	3	3	-	1
	11	143	4	9	20	18	21	21	19	11	6	6	3	3	1	1
	12	218	3	9	22	22	23	33	41	18	17	8	8	8	2	4
	13	96	3	2	7	8	10	6	15	17	9	5	4	7	2	1
	14+	385	4	12	19	20	26	48	41	52	44	28	36	32	11	12
	Total	2789	166	299	487	366	358	399	263	137	98	62	58	60	17	19

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	132	20	32	38	18	9	8	4	2	1					
	1	19	4	5	3	3	3	-	1	-	-					
	2	22	4	5	6	3	2	1	1	-	-					
	3	25	3	5	8	4	1	2	1	-	-	1				
	4	70	10	16	19	13	4	6	2	-	-	-				
	5	109	15	23	31	17	7	10	3	2	1	-				
	6	182	16	33	45	33	21	19	12	1	2	-				
50-54	7	205	27	31	48	35	30	13	10	5	3	1	1	1		
	8	504	45	79	94	87	68	69	26	16	10	4	3	2		1
	9	348	47	46	58	49	54	54	16	8	7	4	2	2	1	-
	10	267	15	30	41	40	45	41	25	8	9	6	3	2	1	1
	11	120	9	11	15	10	16	22	13	7	7	3	3	2	-	2
	12	189	5	14	19	21	16	32	23	16	15	9	7	7	3	2
	13	77	4	4	5	7	8	7	8	9	5	8	3	6	1	2
	14+	316	1	29	16	18	22	26	36	33	36	27	26	29	10	7
	Total	2585	225	363	466	358	306	310	181	107	96	64	48	51	16	15

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	0	130	31	31	30	15	10	7	4	1	1					
	1	15	4	4	3	2	2	-	-	-	-					
	2	31	6	8	6	5	2	2	1	-	1					
	3	28	6	6	7	4	2	2	1	-	-					
	4	60	9	15	14	11	5	3	2	1	-					
	5	103	18	23	25	14	8	7	3	3	1				1	
	6	1588	19	31	36	24	20	18	3	3	2	-	1		1	
55-59	7	159	21	28	35	28	19	11	8	5	2	1	1		-	
	8	333	37	52	61	52	44	43	24	12	1	3	2	1	1	
	9	261	37	38	43	37	38	31	17	9	4	2	2	2	1	
	10	199	13	26	33	29	31	28	16	10	4	3	2	3	-	1
	11	93	7	8	13	10	12	15	7	7	6	3	2	2	-	1
	12	150	3	12	15	15	17	21	14	16	14	6	5	7	3	2
	13	41	1	2	5	2	4	6	4	3	4	2	2	47	1	1
	14+	233	3	14	12	14	17	25	23	26	22	16	16	22	9	14
	Total	1994	215	298	338	262	231	219	127	96	62	36	33	41	17	19

1	2	3	4	5	6	7	8	9	10	11.	12	13	14	15	16	17
60+	0	243	31	84	59	25	18	12	7	3	1	1	1	1		
	1	32	6	11	8	4	3	-	-	-	-	-	-	-		
	2	48	7	18	10	5	4	2	1	1	-	-	-	-		
	3	51	6	16	14	7	2	3	2	1	-	-	-	-		
	4	100	9	33	24	13	7	8	2	1	2	-	1	-		
	5	108	9	35	29	14	7	6	5	2	-	-	1	-		
	6	176	9	49	42	27	20	18	5	3	1	1	1	-		
	7	151	16	35	35	19	17	17	5	3	2	1	1	-		
	8	336	21	75	67	42	44	42	30	5	2	2	1	3	1	1
	9	232	22	50	44	25	34	26	17	7	3	2	1	1	-	-
	10	234	11	39	43	28	36	30	23	10	5	3	2	2	-	2
	11	90	4	13	13	9	14	7	11	6	4	3	1	-	3	2
	12	137	3	14	16	11	17	15	18	13	8	3	4	6	7	2
	13	56	2	3	4	4	6	8	6	5	3	2	3	5	2	3
	14+	241	1	19	14	15	17	26	29	23	24	16	16	20	8	13
	Total	2235	157	494	422	248	246	220	161	83	55	34	33	38	21	23

Grand Total-Distribution by Age and Income Range

Age-Group	Total Freq.	4	5	6	7	8	9	10	11	12	13	14	15	16	17
14	150	33	65	36	11	5	-	-	-	-	-	-	-	-	-
15-19	3406	348	790	1091	685	317	156	14	1	1	1	1	1	-	-
20-24	5491	202	550	1168	1252	1034	856	291	97	24	8	6	2	1	
25-29	6529	181	551	1090	1047	1160	1264	624	318	167	60	31	30	4	2
30-34	5653	207	445	878	820	856	1047	617	318	201	109	70	67	10	8
35-39	4442	136	384	749	658	644	751	440	239	174	94	89	61	13	10
40-44	3524	197	312	575	526	495	533	305	197	122	60	79	88	17	18
45-49	2789	166	299	487	366	358	399	263	137	98	62	58	60	17	19
50-54	2585	225	363	446	358	306	310	181	107	96	64	48	51	16	15
55-59	1994	215	298	338	262	231	219	127	96	62	36	33	41	17	19
60+	2235	157	494	422	248	246	220	161	83	55	34	33	38	21	23
Total	38798	2067	4551	7280	6233	5652	5755	3023	1593	1000	527	448	439	116	114

Source: Table 22

Table D-2

Distribution of Employed Male Labor Force by Age-Group and Education for Each Income Range; Bahamas: 1970

Income Pange 1	Age-Group 2	Total Frequency 3	Distribution by Education														
			0 4	1 5	2 6	3 7	4 8	5 9	6 10	7 11	8 12	9 13	10 14	11 15	12 16	13 17	14+ 18
1	14	33	2	-	-	-	-	1	2	2	8	15	2	1	-	-	-
	15-19	348	13	2	2	7	4	4	14	31	58	111	48	45	3	6	-
	20-24	202	23	2	2	5	5	10	11	14	39	53	15	16	2	5	-
	25-29	181	27	3	3	7	1	4	5	18	32	46	13	12	3	4	3
	30-34	207	17	4	3	4	14	19	12	18	32	49	15	11	3	5	1
	35-39	136	18	1	5	3	6	7	8	14	23	28	9	8	2	1	3
	40-44	197	23	5	4	5	7	8	12	27	34	40	17	10	3	5	3
	45-49	166	22	1	4	6	7	9	9	17	34	32	11	4	3	3	4
	50-54	225	20	4	4	3	10	15	16	27	45	47	15	9	5	4	1
	55-59	215	31	4	6	6	9	18	19	21	37	37	13	7	3	1	3
	60+	157	31	6	7	6	9	9	9	16	21	22	11	4	3	2	1
	Total	2067	227	32	40	52	72	104	117	199	363	480	169	127	30	36	19
2	14	65	3	-	1	-	-	2	4	7	18	26	3	-	-	1	-
	15-19	790	23	3	2	3	8	19	40	61	145	207	144	69	50	13	3
	20-24	550	36	2	3	7	13	21	27	44	111	114	85	41	32	8	6
	25-29	551	55	5	9	9	37	28	40	40	100	88	55	33	24	10	18
	30-34	445	44	6	10	8	21	20	30	33	84	71	39	16	25	4	32
	35-39	384	45	1	7	7	16	13	25	34	73	71	36	14	23	8	11
	40-44	312	32	3	6	5	12	13	24	25	63	50	30	8	15	1	25
	45-49	299	32	3	6	6	14	17	27	30	61	44	27	9	9	2	12
	50-54	363	32	5	5	5	16	23	33	31	79	46	30	11	14	4	29
	55-59	298	31	4	8	6	15	23	31	28	52	38	26	8	12	2	14
	60+	494	84	11	18	16	33	35	49	35	75	50	39	13	14	3	19
	Total	4551	419	43	75	72	185	214	330	368	861	805	514	222	218	56	169

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
3	14	36	-	-	-	1	1	-	2	3	12	16	1	-	-	-	-
	15-19	1091	16	-	1	5	7	14	48	67	181	282	218	129	76	29	18
	20-24	1168	63	2	4	19	24	46	77	112	205	195	183	101	80	28	29
	25-29	1090	72	7	13	19	40	45	91	94	190	181	148	50	71	24	45
	30-34	878	117	9	19	23	44	44	67	82	156	110	96	35	29	11	36
	35-39	749	85	5	22	18	36	52	60	66	135	95	70	36	27	10	32
	40-44	575	52	3	9	11	21	23	67	63	115	76	55	24	22	8	26
	45-49	487	48	3	8	11	19	26	54	51	74	57	48	20	22	7	19
	50-54	446	38	3	6	8	19	31	45	48	94	58	41	15	19	5	16
	55-59	338	30	3	6	7	14	25	36	35	61	43	33	13	15	5	12
	60+	422	59	8	10	14	24	29	42	35	67	44	43	13	16	4	14
	Total	7280	580	43	98	136	249	335	589	656	1310	1157	936	436	377	131	247
4	14	11	-	-	-	-	-	-	-	1	5	5	-	-	-	-	-
	15-19	685	4	-	-	3	2	6	18	29	102	157	147	93	69	29	26
	20-24	1252	34	3	4	10	17	24	53	81	220	217	248	128	113	49	51
	25-29	1047	49	5	10	15	33	36	69	73	192	166	166	76	68	24	65
	30-34	820	44	6	8	8	30	26	64	71	149	129	121	38	56	21	49
	35-39	658	46	3	9	10	28	33	64	54	120	92	87	22	40	16	34
	40-44	526	36	2	7	9	17	17	30	45	107	86	79	18	27	14	32
	45-49	366	23	1	6	10	18	16	31	34	73	49	37	18	22	8	20
	50-54	358	18	3	3	4	13	17	33	35	87	49	40	10	21	7	18
	55-59	262	15	2	5	4	11	14	24	28	52	37	29	10	15	2	14
	60+	248	25	4	5	7	13	14	27	19	42	25	28	9	11	4	15
	Total	6223	294	29	57	80	182	203	413	470	1149	1012	982	422	442	174	324

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
5	14	5	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-
	15-19	317	2	-	-	-	-	-	-	7	31	53	58	55	54	30	27
	20-24	1034	14	1	1	4	7	8	36	42	155	177	203	122	138	46	80
	25-29	1060	33	4	9	4	14	22	66	66	190	203	201	110	116	36	86
	30-34	856	26	2	5	4	14	16	80	64	161	134	130	64	71	28	57
	35-39	644	26	4	4	1	10	13	29	55	126	123	94	48	42	21	48
	40-44	495	22	1	4	4	12	12	36	35	103	90	78	32	27	6	33
	45-49	358	16	2	2	1	7	11	21	31	72	60	55	21	23	10	26
	50-54	306	9	3	2	1	4	7	21	30	68	54	45	16	16	8	22
	55-59	231	10	2	2	2	5	8	20	19	44	38	31	12	17	4	17
	60+	246	18	3	4	2	7	7	20	17	44	34	36	14	17	6	17
	Total	5652	176	22	33	23	80	104	329	366	994	970	932	494	521	195	413
6	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	156	-	-	-	-	-	-	-	3	7	20	19	26	32	19	30
	20-24	856	2	-	1	3	3	8	5	27	83	92	134	100	157	86	155
	25-29	1264	5	1	2	8	14	18	33	50	174	181	209	120	176	80	193
	30-34	1047	22	4	2	7	10	12	32	53	161	168	183	111	107	39	136
	35-39	751	23	1	3	6	8	11	44	44	138	126	118	52	83	22	72
	40-44	533	17	-	3	3	8	7	23	30	116	88	89	30	47	10	62
	45-49	399	13	2	2	3	5	12	29	27	91	53	54	21	33	6	48
	50-54	310	8	-	1	2	6	10	19	13	69	54	41	22	32	7	26
	55-59	219	7	-	2	2	3	7	18	11	43	31	28	15	21	6	25
	60+	220	12	-	2	3	8	6	18	17	42	26	30	7	15	8	26
	Total	5755	109	8	18	37	65	91	221	275	924	839	905	504	703	283	773

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	156	-	-	-	-	-	-	-	1	1	-	2	2	3	2	3
	20-24	291	2	-	-	-	-	-	2	2	2	4	29	36	62	50	102
	25-29	624	2	-	-	1	2	5	8	9	49	52	68	53	108	74	193
	30-34	617	2	-	-	1	2	5	5	26	67	67	82	54	107	50	149
7	35-39	440	5	-	2	1	2	4	3	12	58	60	56	39	59	28	111
	40-44	305	6	1	1	3	2	5	7	12	47	33	44	21	36	17	70
	45-49	263	6	1	2	3	2	3	10	18	33	30	39	19	41	15	41
	50-54	181	4	1	1	1	2	3	12	10	26	16	25	13	23	8	36
	55-59	127	4	-	1	1	2	3	3	8	24	17	16	7	14	4	23
	60+	161	7	-	1	2	2	5	5	5	30	17	23	11	18	6	29
	Total	3023	38	3	8	13	16	33	55	103	337	296	384	255	471	254	757
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
	20-24	97	-	-	-	-	-	-	-	1	2	4	4	9	20	14	43
	25-29	318	1	-	-	-	1	-	4	-	5	10	20	31	59	43	144
	30-34	318	2	-	-	-	2	1	2	5	7	15	27	34	56	36	132
8	35-39	239	1	-	-	-	-	1	2	3	7	10	24	29	41	31	90
	40-44	197	1	-	-	-	1	1	3	4	14	17	24	16	26	17	73
	45-49	137	2	-	-	-	-	1	-	3	14	12	7	11	18	17	52
	50-54	107	2	-	-	-	-	2	1	5	16	8	8	7	16	9	33
	55-59	96	1	-	-	-	1	3	3	5	12	9	10	7	16	3	26
	60+	83	3	-	1	1	1	2	3	3	5	7	10	6	13	5	23
	Total	1593	13	-	1	1	6	11	18	29	82	92	134	151	265	175	615

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-24	24	-	-	-	-	-	-	-	-	1	-	1	2	5	3	12
	25-29	167	1	-	-	-	-	-	-	-	2	6	10	13	23	20	92
	30-34	201	1	-	-	-	-	1	2	2	4	7	12	16	37	24	95
9	35-39	174	1	-	-	1	-	-	1	1	6	7	9	10	30	20	88
	40-44	122	-	-	-	-	-	1	2	3	6	6	8	8	18	8	62
	45-49	98	1	-	-	-	1	-	2	3	5	4	6	6	17	9	44
	50-54	96	1	-	-	-	-	1	2	3	10	7	9	7	15	5	36
	55-59	62	1	-	1	-	-	1	2	2	1	4	4	6	14	4	22
	60+	55	1	-	-	-	2	-	1	2	2	3	5	4	8	3	24
	Total	1000	7	-	1	1	3	4	12	16	37	44	64	72	168	96	475
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	20-24	8	-	-	-	-	-	-	-	-	-	-	-	2	2	1	3
	25-29	60	-	-	-	-	-	-	-	-	-	1	5	5	11	15	23
	30-34	109	-	-	-	-	-	-	-	-	1	7	9	9	15	11	57
10	35-39	94	1	-	-	-	1	1	1	1	1	7	8	6	14	8	45
	40-44	60	1	-	-	-	-	-	1	2	2	4	5	4	7	5	29
	45-49	62	-	-	1	-	-	-	1	1	3	4	5	6	8	5	28
	50-54	63	-	-	-	1	-	-	-	1	4	4	6	3	9	8	27
	55-59	36	-	-	-	-	-	-	-	1	3	2	3	3	6	2	16
	60+	34	1	-	-	-	-	-	1	1	2	2	3	3	3	2	16
	Total	527	3	-	1	1	1	1	4	7	16	31	44	41	76	57	244

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	1	-	-	-	-	-	-	-	-	-	-	-	-	-	--	1
	20-24	6	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3
	25-29	31	-	-	-	-	-	-	-	-	-	2	2	1	4	3	19
	30-34	70	-	-	-	-	-	-	-	-	2	2	3	4	9	8	42
11	35-39	89	-	-	-	-	-	-	1	1	2	3	5	5	13	11	48
	40-44	79	-	-	-	-	-	-	1	1	3	3	5	6	9	9	42
	45-49	58	1	-	-	-	-	-	-	1	-	2	3	3	8	4	36
	50-54	48	-	-	-	-	-	-	-	1	3	2	3	3	7	3	26
	55-59	33	-	-	-	-	-	-	1	1	2	2	2	2	5	2	16
	60+	33	1	-	-	-	1	1	1	1	1	1	2	1	4	3	16
	Total	448	2	-	-	-	1	1	4	6	13	17	25	26	60	44	249
	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	20-24	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	25-29	30	-	-	-	-	-	-	-	-	-	-	3	2	4	4	17
	30-34	67	2	-	-	-	-	-	-	-	1	2	2	4	10	10	36
12	35-39	61	-	-	-	-	-	-	-	-	2	1	1	7	8	6	36
	40-44	89	-	-	-	-	-	-	2	1	2	2	4	6	10	11	50
	45-49	60	-	-	-	-	-	1	1	1	2	2	3	3	8	7	32
	50-54	51	-	-	-	-	-	-	-	1	2	2	2	2	7	6	29
	55-59	41	-	-	-	-	-	-	-	-	1	2	3	2	7	4	22
	60+	38	1	-	-	-	-	-	-	-	3	1	2	-	6	5	20
	Total	439	3	-	-	-	-	1	3	3	13	12	20	26	60	54	244

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
13	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-24	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	25-29	4	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3
	30-34	10	-	-	-	-	-	-	-	-	-	-	2	1	1	-	6
	35-39	13	-	-	-	-	-	-	-	-	-	-	2	-	2	1	8
	40-44	17	-	-	-	-	-	-	-	1	-	1	1	1	2	1	10
	45-49	17	-	-	-	-	-	-	-	-	-	1	-	1	2	2	11
	50-54	16	-	-	-	-	-	-	-	-	-	1	1	-	3	1	10
	55-59	17	-	-	-	-	-	1	1	-	1	1	-	-	3	1	19
	60+	21	-	-	-	-	-	-	-	-	1	-	-	3	7	2	8
	Total	116	-	-	-	-	-	1	1	1	2	4	6	6	21	8	66
14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	25-29	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
	30-34	8	-	-	-	-	-	-	-	-	-	-	-	1	1	-	6
	35-39	10	-	-	-	-	-	-	-	-	-	1	-	1	1	1	6
	40-44	18	-	-	-	-	-	-	-	-	-	1	1	-	3	1	12
	45-49	19	-	-	-	-	-	-	-	-	-	-	1	1	4	1	12
	50-54	15	-	-	-	-	-	-	-	-	1	-	1	2	2	2	7
	55-59	19	-	-	-	-	-	-	-	-	-	-	1	1	2	1	14
	60+	23	-	-	-	-	-	-	-	-	1	-	2	2	2	3	13
	Total	114	-	-	-	-	-	-	-	-	2	2	6	8	16	9	71

Grand Total-(All Ages) Distribution by Income Range and Educ

Income Range	Total Freq															
1	2067	227	32	40	52	72	104	117	199	363	480	169	127	30	36	19
2	4551	419	43	75	72	185	214	330	368	861	805	514	222	218	56	169
3	7280	580	43	98	136	249	335	589	656	1310	1157	936	436	377	131	247
4	6233	294	29	57	80	182	203	413	470	1149	1012	982	422	442	174	324
5	5652	176	22	33	23	80	104	329	366	994	970	932	494	521	195	413
6	5755	109	8	18	37	65	91	221	275	924	839	905	504	703	283	773
7	3023	38	3	8	13	16	33	55	103	337	296	384	255	471	254	757
8	1593	13	-	1	1	6	11	18	29	82	92	134	151	265	175	615
9	1000	7	-	1	1	3	4	12	16	37	44	64	72	168	96	475
10	527	3	-	1	1	1	1	4	7	16	31	44	41	76	59	244
11	448	2	-	-	-	1	1	4	6	13	17	25	26	60	44	249
12	439	3	-	-	-	-	1	3	3	13	12	20	26	60	54	244
13	116	-	-	-	-	-	1	1	1	2	4	6	6	21	8	66
14	114	-	-	-	-	-	-	-	-	2	2	6	8	16	9	71
Total	38798	1871	180	332	416	860	1103	2096	2499	6103	5761	5121	2790	3428	1572	4666

Source: Table 23